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The **Farmer's Digest**

Number 7 January 1956 Volume 19

Protective Milk — World Shaking New Discovery

University of Minnesota scientists announce new principle that promises to control disease in humans and animals, gives still greater importance to product of the dairy cow . . .

Condensed from The Farmer

A new use for milk—that of "protector" of human and animal health—has been developed by Dr. Wm. E. Petersen, University of Minnesota dairy scientist, and Dr. Berry Campbell, Medical School anatomist.

The development puts the dairy cow into a new role. It makes milk an even more vital part of the human diet and introduces a completely new principle of disease control which may greatly increase milk consumption by young and old alike.

The new principle is this: Cows have the ability to produce disease antibodies in milk.

Those antibodies, when consumed in milk, can be transmitted to humans and animals drinking that milk.

Repeated experiments by Drs. Petersen and Campbell have shown that cows' udders, when injected with a wide variety of disease antigens or vaccines, can produce antibodies against each of those diseases.

Milk becomes immunizer

Their experiments also show that humans and nine of ten species of animals tested to date will take those antibodies into their bloodstreams simply by drinking the milk. Antibodies so taken into the body by animals give protection against the disease organism originally injected

Reprinted by permission from The Farmer, St. Paul, Minnesota

into the cow's udder.

Drs. Petersen and Campbell think that the same protection can be extended to humans.

The potential from such a "protective principle" in milk is tremendous.

It can mean, for example, mass immunization of large segments of population. Vaccination of cows may make it unnecessary to vaccinate human beings who consume stipulated amounts of protective milk. Passive immunity could be maintained by persons drinking the milk so long as they continue to drink it.

Protective milk may eventually give immunity against such human diseases as streptoccal "strep" throat infections, measles, smallpox, diptheria, tuberculosis and others. In time it may be possible to immunize against the dreaded infantile paralysis through drinking of protective milk.

"Some of the greatest destroyers of children in America today could be prevented," the research specialists say, "through immunity against the various streptococcal infections which are the forerunners of rheumatic fever."

The protective principle may even apply to certain molds, fungi, pollens and dusts as well as to diseases caused by viruses and bacteria. If it does it will bring an end to hay fever, skin diseases and similar ailments that cause much suffering.

To the farmer, protective milk can mean even more.

Diseases of livestock, particularly those which kill young animals may be sharply curtailed. There is already evidence that antibodies against the worst bacterial diseases of calves—such as pneumonia, scours and others—can one day be produced in colostrum. Immunity, built up through the feeding of milk so fortified, could go a long way toward reducing the 20% losses of calves which now die within the first few weeks after birth.

Farm economists, after a careful study, believe that farm prices will rise about 6 per cent in the next five years. Farm costs will go up slightly.

Baby pig diseases may be controlled by feeding cow's milk specially prepared for them. Sow's milk replacer could thus be fortified with the antibody protection it now lacks. Chick diseases may be combatted in the same way.

Mature livestock may some day be injected with antibody milk after getting a disease. Shipping fever, pneumonia, other bacterial, and possibly virus diseases

may be brought under control by such means.

Dairy farmers may produce specially tailored milk to meet specific disease threats, and be paid extra for their efforts. Disease antigens may be produced by licensed laboratories for use by specially trained technicians. Such technicians, or possibly veterinarians, may inject antigens into the teat canals of dry or milking cows on contracted farms, going about their job in much the same manner as do artificial inseminators now.

May inject combinations

Combinations of different antigens may be injected at one time into the same udder to let a cow produce antibodies against a combination of diseases. Special antigens may be developed for certain regions, seasons or population groups.

"We envision the use of a standard packet of antigens for the vaccination of dairy cows which will serve the great bulk of consumers," Dr. Petersen and Dr. Campbell say in a report of their work being published this month in Journal-Lancet, official publication of several midwest state medical societies.

Milk from such herds will be labeled as to antibodies it contains. It may be carried by milk delivery route men and sold door-to-door as are skimmilk, buttermilk, chocolate and other products today. Or it may be sold as dried milk. It will probably cost a little more than do present milk products, but will be a small price to pay for the benefits of mass protection.

The milk will taste and look exactly as it always has. In fact point out the scientists, milk has always contained antibodies for some animal diseases. The only difference now is that the kinds and amounts of antibodies can be controlled.

Milk may be pasteurized

No changes need be made in present marketing and distribution practices to handle protective milk. Milk containing antibodies can be pasteurized without destroying the antibodies. It can also be dried without destroying the beneficial immune principles. There will be no danger of contracting a disease because antibodies in it are of a "passive" nature. They cannot cause disease as can live-virus vaccines, for example.

All that is still in the future, however.

A hen that lays 250 eggs a year eats only 25 to 26 pounds of feed more than one that lays no eggs. There's no profit in feeding non-producers.

Only three things are definitely established as fact at this time: (1) that cows will produce antibodies against a wide variety of diseases when injected with antigens; (2) those antibodies can be transmitted to humans and most animals by drinking the antibody-laden milk; and (3) immunity has been built up in certain animals to give protection against diseases so far tested in the laboratory.

It still remains to be proved how much immunity can be built up in humans and against what diseases. Preliminary trials by Dr. Petersen and Dr. Campbell, using themselves, volunteer graduate students and other adults as human guinea pigs, have revealed startling successes in control of some of our worst diseases. But many more tests must be made.

Such tests are the next step.

A pilot herd of cows is now being established at University Farm for large-scale testing of conclusions reached thus far. The American Dairy Association, which conducts a farmer-financed program of research as well as its public relations, advertising and merchandising activities, is providing the funds to carry out that testing.

"We feel this is basic research of vital importance to the dairy industry," says Frank Neu, ADA official. "Besides possibly being one of the most important medical advances in history, this project is providing other information on the cow herself as to lactation and milk secretion.

"There is an enormous amount of work which must be done before the practical aspects of this new protective principle of milk are developed," cautions Dr. Petersen. We are fully confident of the ultimate success of our experiments and every effort is being made to speed the necessary additional research work, but it will take time."

HOW TO CARE FOR SHEEP FEET

Care of the feet of sheep to prevent footrot and other trouble is advocated by Richard C. Miller, University of Kentucky. He says the feet of sheep should be examined at least three times a year, and trimmed when needed. A pocket knife or pruning shears may be used. While the hoofs of sheep on the range may wear down, on farms they may need trimming to keep the animals from walking on the side or heal of the foot. Filth may accumulate under the overgrown part of the hoof and cause sore feet, Miller states.

University of Kentucky

Let's Self-Feed Water, Too

Modern pressure water systems and automatic, electrically heated fountains make self-watering both possible and practical . . .

Condensed from Electricity On The Farm

B. A. McKensie

MANY people do not realize that they can self-feed water as easily as feeds and forages.

Water is too often taken for granted. Actually it is a very important factor in livestock production. A dairy cow needs 4 to 5 gallons of water to produce 1 gallon of milk. Milk is composed of 86% water. Eggs are about 80% water, and meat, 65%. Over 50% of the weight of a hog is composed of water. If the animal loses over 10% of its body moisture due to lack of water, death will result.

Modern pressure water systems and automatic electrically heated fountains make self-watering of livestock both possible and practical. During either winter or summer, fresh, clean water can be available to livestock at all times, 24 hours a day.

Research at Iowa State College during a 42-day period in December and January indicated that hogs on automatic fountains gained 10 pounds more during the 42 day period than those that were hand watered. Researchers attributed the difference in weight gains to the fact that hogs on the automatic fountains had water available at all times, while the water for the hand watered hogs soon froze. On another test, they found that dairy cows given free access to ice free water produced over 6% more milk, 12% more butterfat, and drank over 18% more water than cows watered from outside tanks.

Certain factors and conditions should be considered in the selection and installation of an automatic electrically heated water fountain. The first consideration is the type of livestock program being carried on. Electrically heated automatic fountains are made in appropriate sizes for cattle, for hogs, or for sheep. Combination units are also available that will handle both cattle and hogs. If the livestock program

Reprinted by permission from Electricity On The Farm, New York City

is one in which cattle and hogs are run together, the combination unit is more desirable. On the other hand, if each type of stock is kept separately, or if different ages of one type are kept in separate lots, individual units should be used for each group.

After deciding upon a single or combination unit, the water fountain choice should be based on the following factors:

(a) Construction: The unit should be sturdily built of either cast or heavy sheet metal construction so as to withstand rough treatment from livestock.

(b) Cleaning: Ease of cleaning is important as the unit, of necessity, needs frequent cleaning, especially with hogs.

(c) Inlet capacity: Adequate capacity to refill the water bowl as fast as cattle or hogs drink water is important. This is especially true when cattle graze in pasture and come in to drink in large groups.

(d) Protection against freezing: The unit should have a thermostatically controlled heating unit which comes on when temperatures fall below about 35° or 38° F. Since the fountain bowl holds only a few quarts or gallons of water, the amount of electricity required to prevent freezing is relatively low. Most ground water is above 45° F as it enters the fountain.

(e) Ease of installation and servicing: A flexible tubing or a compression fitting, using nylon or neoprene gaskets, makes attachment or removal easier.

(f) Lids: Covers over the drinking bowls will reduce heat loss from water surface up to 50% and will also prevent excess foreign material from contaminating the water.

The first consideration in locating the fountain should be to make water as readily available to the animal as possible. It should be easy for the animal to drink at anytime. This means that the fountain should be in the feed lots or near the grazing area to reduce the amount of walking required of the animal. When pastures are rotated, many farmers lay pipes to each main pasture area and move the fountain to pasture being used.

For paved feed lot installations, some forethought on the pipe

One-fifth of the original area of U.S. tillable land has been ruined for further practical cultivation, chiefly by erosion. About one-third of the present remaining tillable land is already badly damaged by erosion, and more than half of the remainder is subject to erosion. Man-made erosion is dynamic and accumulative and has no end save complete destruction.

layout will help in avoiding future trouble. Pipes should be laid on the square for easy location and connecting as new buildings or fountains are added. A sketch of the piping system with distances from permanent buildings or landmarks should be made and filed with the farmstead records. It is also a good plan to continue some of the pipes beyond the paved area and cap them for future use.

Proper and careful installation of the automatic water fountain is important for best performance from the equipment. Permanent feed lot installations should be made on raised concrete pads at least 6 ft. across. They should slope away from the fountain for proper drainage. A concrete land tile extending from the surface of the concrete pad to a depth of at least 3 ft. below the frost line will serve as a conduit for water and electrical connections and will permit ground heat to filter up and prevent the standpipes from freezing. This heat will be utilized more efficiently if a good seal between the fountain and pad is used so as to prevent drafts from carrying the heat away. Either thin concrete or a caulking compound can be used to make this seal. It is also important to use a shut-off valve in the standpipe to permit removal of the fountain for servicing or for transferring to another pasture or feeding location on rotation operations.

Either overhead or underground electric service may be used to the fountain. Most fountains operate on 115 volts. If underground service is used, the wires may be laid in the trench with the water supply pipe. Provision should be made to switch off power to the fountains for servicing and during warm months. Each fountain should be fused separately. This will permit the choice of a fuse which corresponds to the heating element size of each unit, and any overload will immediately blow the fuse, safeguarding both equipment and stock.

A gentleman was dining at an exclusive restaurant. It seems his veal chops were rather tough, so he called the waiter over to complain.

Diner: "Waiter, these chops are much too tough to be veal."

Waiter: "I can assure you, sir, that they are veal. I was a butcher once and I can tell you that not more than three months ago that meat was on the hoof, following the cow around."

Diner: "Probably so—but not for milk!"

Where metal water pipes are used, the pipe will serve as a ground. When plastic water lines are used, no such "automatic" ground exists and a ground must be supplied by some other method. An 8 ft. approved ground rod is recommended for this purpose. A qualified electrician should be consulted on all wiring.

Most automatic water fountains have built-in facilities for easy cleaning of the water bowls. The bowls should be cleaned daily or as often as deemed necessary. At least once a month the float cover should be removed and the inside flushed out thoroughly. If the float should leak, check for sediment under the valve. Each spring, power should be disconnected from the fountain until cold weather sets in the following autumn.

The cost of operation will vary with the geographical location, the size of the fountain, number of livestock drinking, and special insulation, lids, or other features peculiar to individual fountains. Average installations in the Midwest with 100 pigs, or 75 pigs and 10 to 15 cows, have ranged from 250 to 500 KWHR per season.

Don't Mix HCB, Researchers Warn

Plant pathologists advise wheat farmers that hexachlorobenzene, (HCB) an effective chemical for controlling smut, should not be mixed with other compounds.

Dr. C. S. Holton, USDA plant pathologist, warned against mixing HCB with mercury or other chemicals to control disease problems.

"We are constantly testing every possible combination of HCB and other chemicals but so far all combinations have proved less effective in controlling smut than HCB used alone," Dr. Holton said.

The new smut treatment was announced by researchers recently. Hexachlorobenzene, they said, is as effective as mercury and other compounds in controlling seed-borne smut, and, in addition, is the first chemical they have tested that will control smut spores in the soil adjacent to the seed. HCB will not completely eliminate smut, but it is the most effective control for tall or common smut yet tested, Dr. Holton said. The chemical is specific only for smut and will not control any other disease.

Washington State College

304.38 Bushels from 1 Acre!

This Prentiss County, Mississippi 4-H Club boy breaks through the corn barrier . . .

Condensed from Breeder's Gazette

Lamar Ratliff, the lad who raised it

I JOINED the 4-H Corn Club in 1950 when I was 10 years of age. Most of our farm is too steep for cultivation. So I added forestry to my corn project my second year, and have planted 49 thousand pine seedlings since. Last year I added the pig project because that is the best way to market my corn. I now have a registered Duroc sow and a nice new litter of pigs.

Mr. Taylor Smith, my county agent, told me that if I would prepare a good seedbed, apply plenty of fertilizer, and keep the weeds out I could make 100 bushels of corn on one acre. My Dad didn't believe this was possible. He had never fertilized corn and had never made over 30 bushels on one acre, but he was anxious for me to try.

The first year I broadcasted 20 loads of barnyard manure and plowed it under. I then applied 600 lbs. of 6-8-8 and 200 lbs. of nitrate of soda in the water furrow. I planted Dixie 17 hybrid corn in 36-inch rows spaced 10 to 12 inches in the drill. I sidedressed the corn when it was knee-high with 200 lbs. of nitrate of soda. I made 179 bushels of corn which made me county winner. I told Mr. Smith I believed I could make 200 bushels on that acre. He suggested that I plant a winter cover crop, which I did.

I broadcast 30 loads of barnyard manure the next spring and plowed it and the cover crop under deep. I applied 800 lbs. of 6-8-8 and 250 lbs. of nitrate of soda in the water furrow and planted Dixie 17 hybrid corn in 32-inch rows spaced 10 to 12 inches in the drill. I sidedressed with 250 lbs. of nitrate of soda when the corn was knee-high. I

Repeated by permission from the Breeder's Gazette, Spencer, Indiana

made 187 bushels that year, which made me county champion again. I was also district winner that year.

The county agent helped me get soil samples to send to State College and get tested. They told me to use a heavy application of lime or basic slag. In the spring of 1952, I broadcast 1,500 lbs. of basic slag and 34 wagonloads of manure and plowed this under. I then applied 600 lbs. of 6-8-8 and 400 lbs. of nitrate of soda in the water furrows. I then planted Funk's G-711 Hybrid seed on 24-inch rows spaced 6 inches in the drill. I sidedressed with 400 lbs. of nitrate of soda when the corn was knee-high. My corn really grew off fast, but we were entering our first severe drouth.

We have a 3-acre stock pond which is located above my corn project. My father let me cut that spillway to the lake, and when I started running water down a ditch and into the furrows, you could almost see that corn turning so green it was black. I irrigated this way three times and it really paid off. We gathered 214.1 bushels off that acre. This was high in the County, State and Nation. I was awarded the Breeders' Gazette Gold Medal by Mr. Samuel Guard. He came all the way to Booneville and made the award at a Rotary meeting.

But shucks I still wasn't satisfied. I believed that I could make 300 bushels on that acre. I figured that if I could get 30,000 plants, one ear to each stalk, 100 ears to the bushel that I could make 300 bushels. Mr. Smith told me he thought I was getting too many plants but to go ahead if I wanted to try it. I put 32,000 plants on that acre. That was too many. The sun couldn't get in and I dropped down to 165 bushels.

You can see that disappointments happen in 4-H Club work just as they do in everything else. But I still believed that I could reach that 300-bushel goal. Mr. Smith advised me to subsoil my land to increase the water-holding capacity and to try with about 28,000 plants. So I sub-soiled, broadcast 35 loads of barnyard manure, plowed it under, then I applied 750 lbs. of 6-8-8, 400 lbs. of nitrate of soda, and planted Funk's G-711 hybrid on 40-inch rows spaced 8 inches in the drill. I sidedressed with 350 lbs. of nitrate of soda when the corn was knee-high. We had another severe drouth. Of course, this didn't bother me because I had a 3-acre pond full of water. I irrigated 7 times and made 218.5 bus. It was all corn and no glue. This was high in the State.

I was disappointed 'cause some Yankee farmers from Iowa, Indi-

ana, or Wisconsin beat me last year. I still believed I could make 300 bushels on that acre. So I applied 25 loads of barnyard manure to my acre of sandy loam creek bottom again. I put on 1,000 lbs. of 14-14-14 fertilizer.

On March 23, 1955, I again planted Funk's G-117 Hybrid that had done such a good job for me before. The rows are 30 inches apart and the stalks are 8 inches apart in the row. I put 200 lbs. of ammonium nitrate under the crop, and later side-dressed with 300 lbs. more.

I plowed my corn twice this year. Rains fell, so I did not have to irrigate, but I was ready to tap my Daddy's pond again if necessary.

On Sept. 30th they weighed my corn. It went 304.38 bushels on that one acre.

All of the corn from my acre was weighed in the ear by the agents and in the presence of local witnesses. As a double check they shelled and weighed 3 bushels and the College determined the moisture content to be 13.93%.

That's it, 304.38 bushels on one acre. Mr. Guard said that was the largest yield of our great feed grain ever raised by one man on 43,560 sq. ft. of ground. I'm glad I have helped prove that we can break through the 300-bushel barrier.

Yields and Prices Affect Farm Rentals

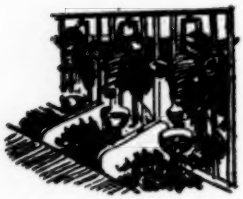
Prospective yields and prices for crops should be considered when rental arrangements are made between farm landlords and tenants, according to L. M. Bauknight. In a bulletin, the South Carolina economist reports that increasing mechanization of farming makes necessary a re-examination of the traditional sharecropper arrangement.

According to the bulletin, the distribution of net farm income in the conventional arrangement (½ to landlord and ½ to tenant) appears to produce results which are quite different when yields are high than when they are low. Furthermore, high prices do not result in the same proportionate division of receipts and expenses as do low prices.

Bauknight found in a recent study that as yields declined the percentage of total net returns going to the sharecropper increased, and that sharecroppers might fare better with a smaller percentage of the crop on a productive farm than with a larger percentage on an unproductive one.

Clemson Agricultural College

Can We Feed Away Milk Fever and Ketosis?



Here's evidence that high-protein rations which put more red meat and less fat on a cow, are the answer to "milking sickness" . . .

Condensed from Farm Journal

William Gilman

HAVE you noticed how much more talk there is about milk fever and ketosis these days? And how the list of new treatments keeps growing?

Maybe we've been innocently bringing these costly and mysterious troubles on ourselves—just by wrong feeding.

That's the belief of several top-notch Northeastern dairymen who are having less trouble than they used to have with these diseases. Their method is *prevention* instead of trying cures after the cow's a "downer"—and maybe a goner.

Mostly, they feed *high-protein rations*—as much as 26% protein when the cow is at a critical stage. Some even add *dried skim milk* to the feed, as a quick source of protein and calcium to ward off both ketosis (also called acetonemia) and milk fever.

These dairymen don't have much need for cures. They report *cutting ketosis cases by well over 90%,* and milk fever by almost as much.

A couple of things about these new preventatives may surprise you:

1) When a cow freshens, these dairymen don't let the sight of a swollen udder, and the fear of mastitis, scare them into jerking the feed away. They feed liberal amounts of high-protein feeds, and surprisingly, run into very little swelling. Pre-milking helps, too.

2) They feed dry cows about the same way. They avoid a fitting ration that's high in fiber and calories. That *puts on body fat* that can fool you into thinking a cow is fit, they say. Actually, the cow that looks sleek may be way behind on the protein reserves she badly needs when she starts milking heavily.

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

How did this feeding idea get started? Dr. R. F. Vigue, a Springvale, Maine practicing veterinarian who does some private researching of his own, is probably its biggest booster. For nearly 11 years now he's kept careful case histories on every cow treated.

"Ketosis is actually an *occupational disease* of the modern, high-protein dairy cow," he says. Why? "Because she's been bred to produce."

"A cow that starts milking 60 to 70 pounds of milk a day right after freshening is draining her reserves. If you try to put the brakes on her those first few weeks by pulling the feed away, she'll still milk as hard as she can, and collapse with ketosis in trying."

"The low-producing cow, on the other hand, seems to be 'immune'," says Vigue. She just plain doesn't put out enough milk to strain her system anytime."

Milk fever is another deficiency —mostly calcium — which vets usually treat by giving calcium gluconate. Trouble is, both diseases tend to hit the same type of cows, and once in awhile you can't tell them apart by looking.

That's why Dr. Vigue's findings are so encouraging. They show that *both diseases* can be drastically reduced by proper feeding.

In fact, it was his experience on Harold Shaw's farm in York County, Maine, that got Vigue started down this research path.

Vigue had milk fever and ketosis calls aplenty throughout York County, but practically never from Shaw. He wanted to know why.

Shaw's herd is among the best in the Northeast. His 80 big Holsteins, which he milks three times a day, averaged 15,151 pounds of milk apiece last year!

Yet, he's in a region where the mixed-grass hay is only fair, and he has to lean heavily on graining to keep the cows producing at forced draft.

You might think that this combination would be a set-up for trouble. But long ago Shaw spotted the connection between high producers, low-protein roughage, and collapsing cows. So he doesn't feed *just any* grain.

Since 1900, Illinois has lost farm land equal to five counties the size of Lake county to cities, roads, parks, factory grounds and other similar uses.

His "lucky number" ration, mixed for him special at a local mill with linseed oil meal as a protein base, figures out 22% crude protein, 18% digestible. And there's no switching around —same mixture year-around for

dry cows and milkers alike (varying amounts, of course). And the *fresh cow gets all the grain her milk-making calls for.* In other words, if she peaks to 80 pounds milk within four or five days, as many do, she gets 20 pounds of grain *today,* not two weeks from now!

Phil Young has charge of the barn for drying-off and freshening animals, and in three years he's had *only one mild case of milk fever and ketosis.* He explains the record this way:

"The feeding does it. With really good legume hay, we could cut back maybe to 16% protein. The idea is for our cows to come in well-fleshed—not fat. There's a whale of a difference!"

"Excess fat is bad for two reasons," adds Young. "It's grain money wasted, and it's likely to bring on ketosis. We want our cows full of red meat and blood to give 'em a fast start."

During last summer's heat wave, a church in the Midwest put this on the bulletin board: "You think it's hot here?"

In his tests, Dr. Vigue discovered that an extremely fat cow has as little as 25% less blood volume per unit of weight than a lean, meaty cow. "The fat one wasn't as well fed as she looked," says Dr. Vigue, "because blood is a cow's precious protein stream. Fat cows are no more healthy than fat people," he adds.

But don't you bring on mastitis by socking protein to fresh cows?

"I haven't yet used up one box of penicillin," says Young. "We've had only two cases—one from a teat injury; the other, infected uterus. The cows freshen in box stalls—plenty of room and bedding. We feed them to be healthy, and look on mastitis as pretty much a management problem here."

High protein feeding bobs up when you talk with other leading New England dairymen. Take Bob Eddy, a well-known Vermont Holstein breeder, for instance. He recalls that when his cows were making world records 25 years ago, he tried everything from 24% protein down to 12% calving ration before settling on the 17% digestible protein level. He figures that was just right—still uses it along with *high-grade roughage.*

An experienced feed man who has really worked on the problem is Donald Hopkins, Greenfield, N. H. He tried feeding more molasses, when ketosis first began showing up about 20 years ago. It didn't help.

Mastitis may be partly to blame for our ketosis problem. Hopkins thinks. "When we became more conscious of mastitis, we blamed it — wrongly — on feeding too

much protein," he says. "Then too, protein prices were going up.

"For these and maybe other reasons, the protein levels of dairy feeds in general have dropped in recent years—from 20% to 24% to around 14% to 16%, with a gain in fiber and energy."

But Hopkins knew nutrition science and noticed how rations were straying from recommendations of the National Research Council. "I know of one 50-cow Ayrshire herd," he says, "that dropped to a 14% protein ration to reduce mastitis. The mastitis stayed — and ketosis came in. Later a vet controlled the mastitis, and a *return to 18% protein feed handled the ketosis.*"

And here's another case: One day in December, 1952, neighbor Lloyd Vose told Hopkins that ketosis had pestered him for years.

He just couldn't figure it out. He had 14 milkers, and 14 cases of ketosis. But his dad, who farmed just across the small Contoocook River, hadn't had a speck of the disease among his 30 Holsteins.

Hopkins paid both father and son a visit. Both fed hay from the same fields, and Lloyd's herd had originally come from his dad's stock, so there was no great difference in breeding.

But Hopkins found one big difference. Father Ed liked his cows to come in well-conditioned, although they looked rather thin compared to son Lloyd's. The son took pride in his cows' fat sleekness. "I was shocked when I woke up to what was going on," he says.

Hopkins balanced up a new menu. It figured out at 16% protein, fed with 30 pounds of Lloyd's good timothy-clover hay and 30 of well-eared corn silage for a 1,200-pound cow producing 40 pounds of milk a day.

"I had just one ketosis case in next two winters," Lloyd tells us, "and 10 more gallons of milk a day."

The largest herd to switch to higher protein was one of about 200 Jerseys, which saw its 10% ketosis rate cut down to 1%. More typical is Jack Malley, of Strafford County, N. H., who feeds his 40 Guernseys a 16% grain ration the year around.

He gives a dry cow eight pounds a day. When she freshens, he raises it as fast as possible to a grain-milk ratio of 1 to 4. Malley is down to one case of ketosis, and no milk fever in more than three years.

The feeding recommendations that Dr. Vigue worked out aren't rigid, because conditions vary from farm to farm. In general, dairymen in his area who have had trouble just switch to a richer protein mixture.

For "problem" cows, Vigue suggests a 20% protein "pre-

scription" ration with animal proteins added—5% fish meal and 5% dried skim milk in pellet form.

The dry cow gets a maximum of eight pounds a day for small breeds; 10 pounds for the large ones. After freshening, they get it at the same rate as they would regular grain. If, when the cow hits peak production, she shows signs of losing body weight, she's switched back to a higher-calorie ration.

This system of feeding helps prevent both ketosis and milk fever. If milk fever still pops up, then Vigue may give the cow skim milk powder — about a pound a day for a couple of weeks. Other vets in the area praise the idea.

Feeding skim milk may sound like priming the pump—but its value is its casein, chock full of protein, and, of course its calcium.

Says Dr. Norman Tufts, veterinarian in Androscoggin Co., Maine, "Just giving the cow calcium isn't the real answer. If it were, you could cure milk fever by giving her plaster." What makes skim milk a good source is that the calcium is in *available* form. The cow can take it into her system. It's rich in protein, and that makes the calcium more digestible.

If you try feeding dried skim milk, don't be surprised if an occasional cow won't like it in her grain. You might have to coax her to eat it. One dairyman who had about eight milk fever cases a year has had only one the past two years. That was in his best cow—and the only one that wouldn't take her dry skim.

Although Vigue's feeding ideas have some new twists, he doesn't minimize the importance of energy or calories in the ration. But energy is more important *after* calving than before, he says.

Does this suggest that you should cross off all of the new treatments for ketosis, and even the old stand-bys for milk fever? Well, it seems that for both troubles, you have a choice between this *preventative protein* and the latest treatments such as those of the vitamin or gland stimulation types.

Dr. Vigue's reaction is that with some new treatments, "we're in danger of forgetting there's a cow around the gland."

There has always been some rivalry between advocates of prevention and of cure. But it's the kind of rivalry that brings progress.

In the meantime, you've got a wider choice of ways to stamp out a couple of diseases that farmers like Shaw find less mysterious than we might think.

Two Ways To Produce Spring Lambs

Should you aim for 85 pounds in June or 100 pounds in October . . .

IN general there are two possible programs for spring lamb production. Many farm flock owners are concerned about which practice is the better one for them to follow.

A. One plan is to breed ewes in the latter part of October or so that they will be able to go on pasture by the time the lambs are two to four weeks old.

Advantages:

1. The weather is less severe and good housing is not so important as for midwinter lambing.
2. Both ewes and lambs will need less grain.
3. Growing roughages can be used to the maximum.

Disadvantages:

1. Few lambs will be ready for the early, high-priced market.
2. Hot weather increases difficulties with maggots and internal parasites.

B. The second plan that has been very successful, judging by flock production records kept in Illinois and other corn-belt states, is to breed ewes in August and September to lamb in midwinter.

Advantages:

1. Farm labor requirements are usually lowest in midwinter when ewes are lambing and the lambs are getting started.
2. Lambs can be marketed in May and June when prices are seasonally high.
3. More of the lambs will be in the top grades.
4. Lambs will escape most of the troubles from maggots and internal parasites.
5. Ewes can be better used for "clean-up" jobs because their lambs have already gone to market.
6. More ewes can be kept and the size of the sheep operation thus increased because pasture needs are less critical than when ewes have lambs at side.

Condensed from a Talk at Illinois Sheep Day, U. S. Garrigus, U. of Illinois

Disadvantages:

1. Ewes and lambs may need more attention during lambing.

2. Ewes and lambs require more grain in order to maintain a high rate of growth and fattening.

3. Lambs eat less roughage because they go to market earlier.

Most people who eat lamb prefer young, meaty cuts with enough finish to make them palatable. Consequently, best prices are paid for the kind of lamb that most consumers want (Choice and Prime).

The percentage of high-quality, meaty lambs is greater in the spring than at any other season, and the market price is ordinarily higher then. High grade lambs usually bring more per hundredweight in the spring than in the fall.

Prices of slaughter lambs tend to decline in the last half of the year. In spite of this price differential producers still feel that the advantages gained in increased weight and in increased "use" of pasture by later marketing outweigh this price variation. Compare the price received for an 85-pound lamb in early June of this year with that of a 100-pound lamb in late September of this year:

85 pounds in June
$24.92/cwt. is $21.18 per lamb

100 pounds in September
$21.33/cwt. is $21.33 per lamb

It would seem, however, that relatively few producers would choose to risk the additional management costs, possible death loss, and interest on their investment for a difference of only 15 cents per lamb. This seems especially true when one considers that:

1. The ewe flock can be increased to use roughage that might be unused because the lambs were marketed in the spring.

2. More low-grade lambs come to market in the fall.

3. Ewes can be used more flexibly after the lambs have been weaned.

All of these factors seem to favor breeding ewes so that their lambs can be marketed early in the summer. This plan is most suitable to the consumer and also offers the best possibility for larger profits to the producer.

Can You Match This?

A pedigreed large white sow owned by Mr. M. O. W. Selwood of Four Acre Farm, Yarrolds Hill, Oxford, England, has achieved the remarkable record of rearing 54 pigs in her first four litters. Her full record is: 1st litter—15 born, 15 reared; 2nd litter—18 born, 18 reared; 3rd litter—12 born, 9 reared; 4th litter—14 born, 12 raised.

Yardstick for Beef Cattle

These Ohio breeders measure gains of breeding stock as a guide for what to expect from their calves in the feedlot . . .

Condensed from The Ohio Farmer

Delmer E. Groves

IN ORDER to make money with beef cattle you need to know which animals will do an efficient job. You know what ration to feed for efficient gains and can tell how an animal has done after you put it across the scales on the way to market.

But, by that time, it's too late. What you need to know is how to produce feeder cattle that will be the efficient-doing kind in the feedlot.

It's not easy to measure this trait in beef cattle. But it can be done. The U. S. Department of Agriculture has been doing this sort of thing for several years at its Montana Range Experiment Station. Also, Charles E. and Robert C. Haigler have been working at this job for close to a decade on their purebred Hereford farm in Fayette County, Ohio.

It all started when they asked neighbors and friends about the purebred bulls obtained from Haiglers for their commercial herds. According to Robert the answers all ran something like this: "We liked him fine but he just didn't get big enough!"

That set the Haiglers to thinking. They wanted to satisfy their customers and stay in the purebred Hereford business. They'd been keeping some weight records on their cattle and so they started to study them. These records showed that the larger animals also made the most rapid gains and that these were sired by one particular bull. He weighed almost 2300 pounds in ordinary pasture condition.

"By the time we figured this out," says Robert, "that bull was dead. Fortunately, we were able to get out and buy back one of his sons. To that bull trace many of the fast-gaining strains that we have in our herd today."

During the first four or five years when Haiglers were progeny testing, they fed out small groups of bulls. In 1947 and '48 two sires were selected from those

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groups for their superior rate of gain. Those two bulls then sired the top-gaining calves in the Haigler herd three years in a row. Now their daughters are producing the rapid-gaining calves in the herd.

The system being used now by Haiglers was set up in 1950. At that time they started weighing and tattooing all calves at birth for positive identification at later dates. At weaning time all calves are weighed again and sorted into two groups by sex.

These two groups are put on self-feeders and fed for 140 days with individual weights taken each 28 days. Out of that group, the top 10 heifers are selected on the basis of gain and type to go into the herd as replacements. Also, the top bull calf is kept for a sire. The others go on sale at private treaty with a price set on each one according to body conformation and gains made in the feeding tests.

While giving them a means for selling good Hereford breeding stock, the system has also upgraded the producing ability of their own herd so that they have better breeding stock for sale. Robert reports: "Since 1950 we have increased the rate of gain on all bulls in our herd by .69 pounds per day and all the heifers by .35 pounds per day. In other words, feeding them 140 days, our bulls now weigh 96 pounds more and our heifers 49 pounds more than the calves that were being raised in our herd five years ago."

Robert points out as further proof of the value of progeny testing: "The first calves of our first 10 heifers selected on this basis gained faster in the 140-day tests than the average of the herd." Not a bad record for first-calf heifers.

"We've found in checking our records," says Robert, "that a certain cow bred to a certain bull will almost always produce a calf that gains very close to the same rate year after year. We can come very near selecting the top end of our cattle each year by looking back over our record books."

This same fact is stressed by Leslie Johnson of the U. S. Department of Agriculture. He said if the first calf from that beef cow is a knothead, you'd better just ship the cow to market and get another cow.

The Haiglers don't propose to select for rate of gain alone and ignore type, even though the reverse of this seems to have been done in the beef cattle game for years. You need to select for both rate of gain and type, thinks Robert. And don't forget the rapid gainers use feed to best advantage.

Cattle are priced according to rate of gain with judgment of

type weighted in the price. This year's bulls were offered at from $275 to $1200 per head. The poorest bulls go to the stockyards at slaughter prices.

Charles E. Haigler, the grand old patriarch who is senior member of the Haigler partnership, has a new wrinkle this year. He has worked out a gain ratio to help in measuring the value of the bulls.

Here's how it works. The 53 bulls fed during the fall and winter of 1954-55 made an average gain of 289 pounds per head. Thus, 289 becomes the yardstick and is given the index number of 100. Bulls which gained less than 289 pounds will have a gain ratio of less than 100 while those which gained more than 289 pounds will have a gain ratio of above 100.

Let's figure the gain ratio on a bull that gained 320 pounds. We divide 320 by 289 and multiply by 100 to get rid of the decimals. We arrive at the gain ratio figure of 111, which means that bull gained 11 per cent faster than the average of all the bulls.

Why a complicated figure like this? Well. it gives Haiglers a way to keep a comparable set of figures on both sides of the pedigree for each animal. And as Charles says: "I've told people all along that the gain on any one animal here doesn't mean much — it's comparison with a larger number of animals handled under the same management that counts. You've got to have 25 to 50 animals or more on test."

Charles points out: "A purebred breeder up the road may be a more skillful feeder. He may get three pounds of gain where we only get 2½ pounds under our ordinary feeding methods. If he uses this gain ratio figure on all the calves in his herd he's on pretty much the same basis as we are. If he says just 'pounds gain per day or total pounds gained' it's not a fair comparison of the gaining ability of the animals."

Haiglers have found that high birthweight is a good omen of big size in a bull. Fast gains up to weaning time are sometimes overtaken when the bulls go on the 140-day feeding test. No nurse cows are used.

Here's an actual example Charles Haigler cites: "One of the calves with a heavy birthweight by weaning time had fallen 100 pounds behind some of the others born that year. Evidently his mother didn't give enough milk. This calf seemed to have that growth factor we're looking for. When he got on feed he caught up with most of them. By the time he was sold in August he weighed 1030 pounds and was again the heaviest bull."

. . . Lime Pays . . .

Research proves that adequate applications of lime will bring good returns on your investment . . .

Condensed from Nebraska Farmer

Carl Deitemeyer

LIME pays and pays . . . if your land needs it.

The lime-use story isn't a new one. However, more and more farmers are using the material to sweeten the soil as well as the pocketbook by producing higher crop yields.

Where there is a deficiency of lime, sweet clover stands will frequently fail, as will alfalfa and red clover. This condition has an indirect effect on corn and small grain yields, too, These legumes, which are attempting to grow with a deficiency of lime, don't grow luxuriantly enough to place the needed nitrogen in the soil for the corn and small grain.

Dr. M. D. Weldon, agronomist at the University of Nebraska, and Nebraska county agents have been telling the lime deficiency story with pile-driving effect.

Back in 1929-32, tests conducted at the University of Nebraska college of agriculture showed that over a four-year period alfalfa plots treated with lime produced a total of 15 tons; untreated 12 tons.

Another college experiment showed that a new seeding of alfalfa without lime produced .8 ton of hay containing 300 pounds of protein. The plot treated with 500 pounds of hydrated lime drilled with the seed produced one ton of hay which contained 410 pounds of protein.

Is it any wonder then that the smart hay buyer wants to know if the alfalfa he inspects has been growing on limed and superphosphated soils?

There is an old saying:

"Lime and lime, without fertilizer and barn yard manure, makes father rich and son poor!"

Soils should always be checked for lime and fertility needs. Soil Scientist Weldon gives these practical suggestions:

A. Don't guess. Have your soil tested. See your county agent for taking soil samples.

B. Send your soil samples in

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early. Allow at least six weeks before seeding or planting.

C. Lime can be applied any time of the year. It should be disked or plowed under six months or more before seeding. If that is not possible apply anyway. If you have a stand of alfalfa and the soil needs lime, apply it.

D. Amount of lime needed will vary from one to four tons per acre. Average treatment is two tons.

E. It is possible to apply too much lime. Although, if twice as much is used than needed it will not make too much difference. Maximum treatment will last longer than minimum.

F. Amount of lime to apply depends upon the acidity of the soil and whether it is sandy or clay. On a sandy soil that is medium acid, legumes frequently fail to make a stand. While on a clay loam, medium acid, legumes usually make a fair stand. On the other hand, clay loam soil needs more lime than sandy soil of equal acidity.

G. If soil is so acid that sweet clover fails it is in serious condition. Don't wait until legume crops fail before liming the soil. It is more profitable to maintain a good soil than to restore a poor one.

H. Lime hastens decay of organic matter. Use of lime will increase the need of other fertilizers. Plants grow better and need the extra fertility to produce the larger yields. Phosphorus is particularly needed in this situation.

Lime lasts a long time. Six tons of lime on test plots at the University of Nebraska agronomy farm in 1921-25-29 have produced outstanding results for 21 years. Each treatment was at the rate of two tons per acre. A two ton treatment of lime every ten years is usually adequate.

Get The Jump On Milk Fever

Milk fever is bad medicine in any dairy herd.

The best way to get rid of milk fever is to prevent it, advises W. R. Van Sant, Arizona dairy specialist. And, the best way to prevent milk fever in most cows is to feed dry cows a ration low in calcium and high in phosphorus. Do this for about a month before calving.

A good concentrate mixture for dry cows contains 100 pounds of cottonseed meal, 800 pounds of ground barley, 500 pounds of wheat bran, 600 pounds of rolled barley, 40 pounds of monosodium phosphate, and 10 pounds of salt.

University of Arizona

When to Sell Veal Calves . . .

Will it prove the most profitable to sell veal calves at 3 days or at 180 pounds?

Condensed from Successful Farming

Warren H. Vincent, Mich. State College

IF YOU have cows freshening soon, you may be wondering whether it will pay you to sell your veal calves at 3 days of age, or put some milk through them and sell them at around 180 pounds.

Naturally you want to do whichever will make you the most money. If you can put the milk through vealers and make enough more than the value of the milk to take care of the risk, the labor, building space, and your trouble, you'll consider putting the extra weight on the calves. Otherwise you'll sell the calves at about 3 days of age, sell the milk in the can, and save yourself the trouble.

The table below will save you some figuring in trying to decide when to sell. The predictions of the price of vealers and of excess milk are based on monthly averages for the past 4 years. The table assumes that to get a calf to 180 pounds will take: 90 days and 1,200 pounds of milk for a 60-pound calf; 70 days and 1,050 pounds of milk for a 75-pound calf; and 45 days and 850 pounds of milk for a calf weighing 95 pounds at birth. The table also assumes that you'll sell the calves as Good to Choice vealers.

Based on these assumptions, the figures in the lower part of the chart show how much more you could get for excess milk by selling it through 180-pound veal calves, rather than selling milk in the can and selling the calves early. These figures *do not* include any leeway for death losses, labor, and so on.

If veal-calf prices follow the tendencies of the past 4 years, they will be highest during the first 5 months of the year. Then they will taper off slightly for the rest of the year.

Reprinted by permission from Successful Farming, Des Moines, Iowa

Your return from putting excess milk through calves depends a great deal on the size of the calf at birth. Small and middle-size calves bring little more in net return when sold as 3-day-old calves than when sold at 180 pounds, especially later in the year.

Putting milk through veal calves does not fit well with a program of fall freshening. Dairymen in need of base would not feed excess milk during the base-forming months—they'd be interested in building a higher base for the rest of the year. Also, calves born after July 1 usually would be drinking higher-priced milk and would sell for less.

Except for the higher returns over milk value shown in the combinations that appear below the wide black line in the table, it is felt that the expected return from selling excess or manufactured milk through veals is not enough to allow much for added costs.

Date calf born	March 15	April 15	May 15	June 15	July 15	Aug. 15	Sept. 15
If veal prices are (per hundred)	$19.19	$18.43	$19.57	$19.00	$17.82	$19.00	$18.62
and excess milk brings (per hundred)	$ 2.55	$ 2.50	$ 2.50	$ 2.45	$ 2.50	$ 2.55	$ 2.60

Then read below the return over value of excess milk you can get by selling milk through 180-pound veal calves instead of selling at 3 days

Sell	June 13	July 14	Aug. 13	Sept. 13	Oct. 13	Nov. 13	Dec. 14
60 lbs. at birth	$ 4.25	$ 2.40	$ 4.24	$ 3.64	$ 2.42	$ .60	$ .58
Sell	May 24	June 24	July 24	Aug. 24	Sept. 23	Oct. 13	Nov. 24
75 lbs. at birth	$ 8.82	$ 8.05	$ 6.56	$ 7.67	$ 6.85	$ 6.23	$ 4.32
Sell	April 29	May 30	June 29	July 30	Aug. 29	Sept. 29	Oct. 30
95 lbs. at birth	$11.77	$13.55	$12.16	$11.93	$12.31	$11.35	$10.10

New Soybean for North Developed

Grant, a new high-yielding, high-oil-content soybean variety of early maturity in northern areas, has been developed by the U.S. Department of Agriculture and Experiment Stations in South Dakota, Minnesota and Wisconsin.

South Dakota and Minnesota experiment stations will release Grant seed to certified seed growers next spring. The maturity period for Grant is the same as for Mandarin, but 3 days earlier than Chippewa and 4 days later than Norchief. Its oil content is 20.2 per cent and is comparable with that of Chippewa and Norchief varieties, and better than that of Mandarin.

Looking Ahead In the Hog Business

A long term outlook for the hog industry . . . something to think about during the current period of low prices . . .

Patron's Guide

Dr. S. W. Terrill

THE hog business is big business. Visualize, if you can, the farm payments, new cars, college educations, machinery and farm improvements made possible each year by this traditional "mortgage lifter."

Hog and corn production go hand in hand. We feed about one-half of our corn crop to hogs each year. And we use soybean oil meal—one of the two major products from soybean processing—extensively in swine supplements. Yes, we are going to continue to be interested in hogs as a means of marketing corn and soybeans from the Corn Belt.

Future Bright for Hogs

The long-term outlook for the hog industry appears to be very favorable. Of course, from a short-term standpoint, some years are much better than others: 1952 brought producers many headaches; but 1953 and early 1954 were certainly favorable periods. In some years, unrealistic corn support prices have caused more extreme "ups and downs" than would have occurred otherwise. However, a look at trends in population growth and eating habits and a brief review of the natural advantages of raising hogs give cause for optimism concerning the future of the hog business.

Population trends. We have about 165 million people in this country at the present time. Experts tell us that by 1975 there will be over 200 million. If living standards stay about the same, this will mean a demand for much additional milk, eggs and meat, including more ham, bacon, pork chops and pork roasts. In fact, meat output hasn't been keeping pace with population increases.

Eating habits. The modern eater is choosing more high-protein foods and less high-energy foods than did mother and dad or grandfather and grandmother. Consequently there has been a

Condensed from an article by Dr. S. W. Terrill of the University of Illinois

steady increase in per capita consumption of meats and eggs and a decrease in the consumption of potatoes and cereals. Of course, economic changes could alter this pattern.

Advantages of Raising Hogs

There are a number of good reasons for raising hogs. The hog is an efficient converter of feed to pork. A hog enterprise fits well with other farm enterprises. Hog operations can be expanded or contracted rather quickly and permit a quick turnover of capital. Hogs can be quite profitable in almost any volume, whereas under present conditions poultry and dairy enterprises must be large in order to compete with other operations in efficiency. Large-volume hog production does not require large acreages, and the market value of discarded breeding stock is high.

Will the Hog Industry Parallel the Poultry Industry?

Let's look at one of our compatriots, the poultry industry. It has come a long way since the day when "setting the hens" was an annual spring job. Now one man using modern equipment can handle 30,000 or more broilers. He can sell three or four broods a year, producing birds weighing 3 to 3¼ pounds at 9 to 10 weeks of age on as little as 2.6 pounds of feed per pound of gain.

What brought about this revolutionary change? These are probably the most i m p o r t a n t reasons:

1. Greater efficiency due to—
   a. Specialization resulting in the use of mass-production and labor-saving methods.
   b. Improved feeding.
   c. Improved breeding.
   d. Improved management, with better control of disease an environment.
2. An improved product to sell the consumer.
3. Broiler financing by the feed industry.

Increased application of research findings is responsible for many of the improvements in efficiency and end-product. To make progress, an industry must increase its efficiency and produce an improved product. This applies to any industry, whether it produces automobiles, refrigerators, electric shavers, toothpaste, or pigs. Credit policies must be sound or an industry is in for trouble.

Looking Ahead

Predicting the future is hazardous. Nevertheless it would appear that the hog industry will see greater specialization, greater efficiency and greater application of research results. But these changes will be much more gradual and less extreme than those that occurred in the poultry industry.

Specialization will not proceed to the point of one-enterprise farming. Diversified farming has the advantage of spreading the risks over more enterprises, and the enterprises may complement each other, such as hogs and grain or grain, hogs and feeder cattle. It looks as if there may be some reduction in number of enterprises per farm, but it will be reasonable to expect greater emphasis on efficiency and specialization in the remaining enterprises to give greater volume.

Importance of Efficiency

When prices of farm products go up, they usually go up faster than farm costs. This often occurs during wartime economy. When it does occur, it is usually most profitable to increase volume at the expense of some efficiency. When farm prices go down, they usually go down faster than farm costs. Prices have declined during the past four years. When that happens, efficiency becomes very important, and it will continue to be very important in the future.

Breeding, Feeding and Management Changes

Research results will point out practices that show promise of improving efficiency and profits. But only those that pass the tough economic test of on-the-farm use will survive. Although we cannot predict these changes with any degree of accuracy, we can suggest some possible changes in breeding, feeding and management that may prove effective under present conditions.

Breeding. Much progress will be made here. Seedstock producers are experiencing a strong demand for tested breeding stock. Purebred breeders are rapidly increasing the scope of their testing programs. They are concentrating their efforts on these points:

1. Meat-type carcass characteristics as determined by live backfat probing on boars and gilts and slaughter information on barrows where possible.

2. Growth rate as measured by weight at 5 or 6 months of age.

3. Feed efficiency as determined by feed and growth records at a testing station or on the farm. Because feed efficiency and growth rate are highly associated, selection for growth rate is automatic selection for feed efficiency.

4. Brood-sow productivity as determined by litter weaning weights.

Boar testing stations will increase in number. Boar pigs from the best herds can then be tested more extensively and compared under the standardized conditions at the test station.

These efforts will furnish commercial hog producers with better

stock. It costs money to do the testing needed to produce stock with greater potential. Tested boars will therefore cost more—but they'll be worth it.

Commercial hog producers will make more use of rotation breeding systems to take advantage of hybrid vigor in broodsow productivity and good pig survival and growth rates.

Swine breeding research workers will continue to search for improved methods of selection, inbreeding and linecrossing with a view to getting better stock and more hybrid vigor through the application of scientific methods.

Early weaning offers some advantages to the specialized hog producer, but more testing must be done under practical field conditions before weaning at the age of one week or less can be recommended without reservation. The best plan is for each commercial hog producer to "work down" to the weaning age that will best fit his management conditions and give him the lowest total cost per pig. Producers who have been weaning pigs at the conventional eight weeks should try weaning at five to six weeks and using good pig starter rations. If it works well, they can then try weaning at three to five weeks. Good management, nutrition and sanitation become particularly important when pigs are weaned at an early age.

Pig hatcheries. Pig hatcheries are considered a desirable part of the hog industry because there is often a good demand for thrifty weaned pigs. But the hatchery business has been held back by disease difficulties and supply, demand and price problems. Hatcheries will probably be most successful on the fringe of the Corn Belt, where small grains and pasture can supply most of the feed and where labor, land and building costs can be kept low. They will give the skilled hog man in this area an opportunity to specialize. More weaned pigs will probably be produced for sale in southern Illinois than formerly.

Drylot vs. pasture. There is increased interest in raising hogs on concrete drylot, and it will probably continue, particularly among producers who wish to specialize in hogs and who use modern buildings and labor-saving equipment efficiently the year round. Pastures will continue to be used extensively for the sow herd. On diversified farms with legumes as an integral part of the crop rotation, livestock producers will continue programs that take advantage of sanitation and labor- and feed-saving benefits of a pasture program. With flexible modern equipment and concrete platforms, a combination program of winter drylot and summer pasture feeding will be used.

Complete rations vs. corn and supplement free choice. Preliminary tests showed little advantage for complete rations over free-choice rations when fed in drylot. On pasture, the pigs fed the complete ration gained significantly faster, but with no saving in cost of gains. Under field conditions, results may be less variable when complete rations are fed, but costs will determine the extent to which complete ration feeding becomes popular.

A fundamental part of the Illinois Plan for Swine Feeding (Illinois Circular 719) is the use of supplements to make up deficiencies in home-grown grains. Hog farmers will favor custom-mixing or bulk deliveries of complete mixed rations if costs are low and if satisfactory arrangements can be made for them to supply their own grain or deliver grain to be credited to future complete ration mixes. More large-volume livestock farmers will install feed grinding and mixing equipment on their farms.

Sow-feeding. Past Illinois research dealt with maximum use of legume pasture in the summer and grass-legume silage in the winter to cut bred-sow feeding costs. The results of this research raised a question about how much weight a sow needs to gain during gestation in order to farrow good-sized litters of healthy pigs.

Preliminary results showed that farrowing performance was as satisfactory when bred sows and gilts were fed 4.5 pounds of a good ration per head daily in winter drylot as when they were fed the usual 6 pounds per head daily. Research on this problem is continuing.

Environment control. Future research will deal with control of the non-genetic factors that cause variation in swine performance. Greater use will probably be made of drugs and medicants to control diseases and parasites. A cheap, safe chemical that would kill roundworm eggs in the intestinal tract of the pig would be a boon to the hog industry. New vaccines and treatments will be developed as disease research begins to catch up with many of our widespread swine diseases.

Did you know . . . That a single pound of cotton can be spun into as much as 70 yards of fabric?

More attention will be given to buildings and equipment that control temperature, humidity and air movement as well as reduce labor. Increased use will be made of farrowing stalls and automatic feeding and watering equipment.

FEEDING the DAIRY HERD

Step-by-step, how to use the latest practices to make money on a dairy farm . . .

Condensed from Wisconsin Circular 39

George M. Werner and *James W. Crowley*

GOOD feeding has two goals. First it must provide enough of all nutrients for maintenance, growth, reproduction and milk production. Second, it must provide these nutrients by methods which will leave the greatest net profit for the dairyman.

For the most economical feeding the dairyman must make full use of his soil to produce large yields of high-quality homegrown feeds.

Hay and pasture crops produce excellent yields of high quality feed, but there is no satisfactory cash market for these crops. Good dairy cows are very efficient at converting roughage into milk—an excellent food that can be sold for cash. Therefore, the cow becomes the market for these crops. The pay-off in dairy profit comes from good milk production per acre of crops produced.

Base Your Herd on Roughages

Feed grain only as a supplement. To make maximum profits from dairying you need to produce, harvest, store and feed good roughages. The quality of your roughage will depend on the kind of crop, stage of growth at cutting time, weather damage, leaf loss during harvesting and storing and loss of nutrients while in storage.

How Much Grain to Feed?

The feed requirements of a cow are determined by the amount and fat test of the milk she produces, her age, size and condition. The quality and amount or roughages you feed her determines the kind and amount of grain she needs. If you feed good roughages, decrease the amount of high protein feeds in the grain mixture. The better roughages are also more palatable and more digestible, so less of the grain mixture needs to be fed. The amount of roughages the cow eats is not determined by the quality alone. She

Reprinted from Wisconsin Circular 39, Feeding the Dairy Herd, University of Wisconsin, Madison, Wisconsin

will eat less if you feed a lot of grain.

Feed grain according to production. This thumb rule will help determine how much grain to feed daily under average conditions.

Holstein—1 pound grain for each 4 pounds milk.

Brown Swiss, Ayrshire, Milking Shorthorn—1 pound grain for each 3.5 pounds milk

Guernsey and Jersey—1 pound grain for each 3 pounds milk

If you feed good roughage liberally, you'll need less grain. For example, you can feed a Holstein cow on good pasture a pound of grain for each 5 to 8 pounds of milk. And if a cow produces less than 20 pounds of milk daily, you won't have to feed anything in addition to good roughage.

Here is another thumb rule that allows for feeding less grain with better roughages. To determine the pounds of grain to feed daily with *excellent* roughage, divide the pounds of butterfat per month by 6; with *good* roughage, divide the pounds of fat per month by 5; and with *fair* roughages, divide the pounds of fat per month by 4. This thumb rule was used to calculate the grain to milk ratios given for each class of roughage on the following pages. Feed roughages liberally and use the thumb rule *only as a guide.* You'll have to make adjustments for individual herds and even individual cows in the herd.

Keep Only Good Cows

Greatest profits from feeds can be obtained when they are fed to good cows. Every herd owner needs to continually cull out the less efficient producers. Poor cows, disease, or poor management can make any feeding program fail.

Look For The "Best Buys"

If you find it necessary to buy farm grains, keep in mind that if ground corn is rated 100 per cent, ground wheat rates fully 100 per cent, ground barley and rye rate 95 per cent, corn and cob meal 90 per cent, and ground oats 90 per cent.

Whenever homegrown grains will not fully supplement the roughages on hand, it's good business to buy protein feeds to mix with them.

In buying protein supplements, remember that linseed meal, soybeans, gluten meal, cottonseed meal, and straight 32-40 per cent dairy feeds are all of about equal value when fed in proper combinations with other feed. Gluten feed is worth about 80 per cent as much as these feeds, dried brewers' grains about 70 per cent, and wheat bran 60 per cent.

Read Labels

Check particularly protein and fiber. Other things being equal, low fiber feeds (below 8 per cent) are worth more than high fiber feeds. (12 per cent and up).

Grind barley, wheat and rye

medium coarse rather than fine. In fact, except where it is desired to kill weed seeds, there is no advantage in fine grinding of any grain for cows.

Crimpling or Crushing is Okay

Add one pound of trace mineral salt to each 100 pounds of grain mixture. Give free access to additional salt. All Wisconsin cows need salt and iodine and in some areas cobalt is needed. The addi-

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tional phosphorus is supplied when the grain mixture contains as much as 20 per cent wheat bran or the high protein feeds and normal amounts are fed,

Feed additional phosphorus when the grain mixture is mostly farm grains and where soils are low in phosphorus. You can supply phosphorus cheaply by adding 1 to 2 per cent bonemeal or defluorinated rock phosphate to the grain mixture. Both bonemeal and rock phosphate also supply calcium. If you feed poor, grassy hay, especially where soils are acid, supply additional calcium by adding 1 to 2 per cent finely ground limestone. If possible, use free choice feeding of both salt and bonemeal.

Vitamins

The practical ration usually supplies adequate amounts of all

A deficiency is apt to occur only after prolonged feeding of poor roughages.

Vitamin D may be obtained from feed or by direct exposure to sunlight. The main feed source of Vitamin D is sun-cured hay. Wilted hay silage and barn dried hay contain Vitamin D. Cows that receive very little suncured hay during the winter months may need additional Vitamin D. This can

will eat less if you feed a lot of grain.

Feed grain according to production. This thumb rule will help determine how much grain to feed daily under average conditions.

Holstein—1 pound grain for each 4 pounds milk.

Brown Swiss, Ayrshire, Milking Shorthorn—1 pound grain for each 3.5 pounds milk

Guernsey and Jersey—1 pound

It all goes to show that farming is like any other business . . . .

You have to keep informed to succeed with it. That is why Farmer's Digest is so important to you . . . why you should read every issue. Only Farmer's Digest gives you so much usable information in palatable, easy-to-read form at so low a cost. In Farmer's Digest, you get the very best from more than sixty U. S. and foreign farm magazines.

month by 5; and with *fair* roughages, divide the pounds of fat per month by 4. This thumb rule was used to calculate the grain to milk ratios given for each class of roughage on the following pages. Feed roughages liberally and use the thumb rule *only as a guide*. You'll have to make adjustments for individual herds and even individual cows in the herd.

Keep Only Good Cows

Greatest profits from feeds can be obtained when they are fed to good cows. Every herd owner needs to continually cull out the less efficient producers. Poor cows, disease, or poor management can make any feeding program fail.

Look For The "Best Buys"

If you find it necessary to buy farm grains, keep in mind that if feed is worth about 80 per cent as much as these feeds, dried brewers' grains about 70 per cent, and wheat bran 60 per cent.

Read Labels

Check particularly protein and fiber. Other things being equal, low fiber feeds (below 8 per cent) are worth more than high fiber feeds. (12 per cent and up).

Grind barley, wheat and rye

medium coarse rather than fine. In fact, except where it is desired to kill weed seeds, there is no advantage in fine grinding of any grain for cows.

Crimpling or Crushing is Okay

Add one pound of trace mineral salt to each 100 pounds of grain mixture. Give free access to additional salt. All Wisconsin cows need salt and iodine and in some areas cobalt is needed. The addition of 1 per cent trace mineral salt to the grain mixture provides adequate insurance against all trace mineral deficiencies.

Calcium and phosphorus make up about three-fourths of the total mineral matter of the cow's body. And large amounts of these minerals go into producing milk. Pasture and roughages (especially legumes) are good sources of calcium. The grains (especially protein concentrates and bran) are good sources of phosphorus. Since dairy cattle eat large amounts of roughages, they are not likely to be deficient in calcium. Ample phosphorus is supplied when the grain mixture contains as much as 20 per cent wheat bran or the high protein feeds and normal amounts are fed,

Feed additional phosphorus when the grain mixture is mostly farm grains and where soils are low in phosphorus. You can supply phosphorus cheaply by adding 1 to 2 per cent bonemeal or defluorinated rock phosphate to the grain mixture. Both bonemeal and rock phosphate also supply calcium. If you feed poor, grassy hay, especially where soils are acid, supply additional calcium by adding 1 to 2 per cent finely ground limestone. If possible, use free choice feeding of both salt and bonemeal.

Vitamins

The practical ration usually supplies adequate amounts of all vitamins needed by cows. Vitamins A and D are the only two which may be lacking in the usual ration.

Cows get Vitamin A from plants where it is present as provitamin A or carotene. The amount of green color in the feeds is an indication of their value as a source of Vitamin A. Pasture, hay silage, hays and yellow corn provide Vitamin A. And the cow stores a reserve when she is on pasture or on other feeds that supply excessive amounts. The reserve can be used when the ration is deficient. Therefore, Vitamin A deficiency is apt to occur only after prolonged feeding of poor roughages.

Vitamin D may be obtained from feed or by direct exposure to sunlight. The main feed source of Vitamin D is sun-cured hay. Wilted hay silage and barn dried hay contain Vitamin D. Cows that receive very little suncured hay during the winter months may need additional Vitamin D. This can

be supplied by adding ½ pound irradiated yeast to each ton of grain mixture.

Feed Dry Cows Well

Have cows in good condition when they freshen. Cows in good flesh when they dry off may require only good hay, silage or pasture. Those that are thin should be fed some grain also.

If cows are well fed during the latter part of the lactation period, most of them will be in good condition when dried off and heavy grain feeding during the dry period can be avoided.

Keep the mangers full of roughage. Cows cannot get feed from an empty manger. Use hayracks and silage bunks in the cow yard to get cows to eat more roughage. If the hay is not of best quality, feed it liberally and let the cows pick out the best.

Pastures

Luxury for the cow is economy for the dairyman. Good pasture and plenty of it will keep milk cans full and reduce feed and labor costs of barn feeding. Such pastures may be produced by properly fertilizing, managing, and planning a succession of crops. And they'll produce more grass by managed grazing.

Whenever pastures fail to keep up milk production, pasture can be supplemented with silage or hay, or both. Put up silage in the spring or early summer to provide feed when pasture is short later in the summer. With adequate pasture or forage, and some grain feeding during the summer, you can avoid slumps in milk production and complete the year with higher production records.

Green Feeding

In place of pasture some dairymen cut green crops daily and feed them to cows during the pasture season. This program seems more practical for large herds than for small ones.

Getting the Most Out of Roughage & Protein Feeds

The trick to balancing a dairy ration is to use only as much grain or protein feed as you absolutely need. Grain is a supplement. Knowing the quality of your roughage will help you to keep costs for other feeds as low as possible. Knowing the protein content of the different feeds will help you use them economically.

Below you will find the different grains and mill feeds grouped by how much protein they contain.

Group A—Low Protein (Up to 14%)

Molasses
Beet Pulp
Corn and Cob Meal
Ground Corn
Hominy Feed
Ground Oats
Ground Barley
Ground Rye
Ground Wheat

Group B—Medium Protein (15 to 17%)
- Distillers' Dried Rye Grains
- 16% Dairy Feeds
- Wheat Bran
- Wheat Middlings
- (Standard or
- Red Dog Flour)

Group C—Medium Rich in Protein (20 to 26%)
- Malt Sprouts
- Dried Brewers' Grain
- Distillers' Dried Corn Grain
- 24% Peanut Meal
- 24% Dairy Feed
- Corn Gluten Feed

Group D—Rich in Protein (32 to 43%)
- 32% to 40% Dairy Feeds
- Linseed Meal
- Ground Soybeans
- 41% Peanut Meal
- Corn Gluten Meal
- Cottonseed Meal
- Soybean Meal

ASK YOURSELF THESE QUESTIONS:

How Good is My Roughage?

Excellent High Protein Roughage—Mainly legumes. Either hay or silage from legumes cut in the early bloom stage and put in with very little weathering or leaf loss. Put in good storage so feed value is preserved. Top-notch pasture comes in this class. Includes early grasses and legume-grass pastures that are grazed before the legumes come into full bloom.

Good Medium Protein Roughage— Similar to excellent but coarser, slightly damaged by weather, cut at a latter stage of growth, or suffering some leaf loss.Includes early cut grass and heavy grass mixtures, combinations of excellent and fair roughages fed together, and excellent roughages damaged some in storage. Pastures in this class supply abundant grazing but are more mature than excellent pasture.

Fair Low Protein Roughage—Average hay and hay silage that has lost a lot of leaves and color due to weather damage or late cutting. Also grasses cut in mature state. Corn silage falls in this class because of its low protein content. Pastures in this class supply plenty of grazing but are drier and quite mature.

Poor Very Low Protein Roughage — Very low in protein and hard to digest. Includes late cut and badly weathered hays, corn stover, straw, and corn silage without ears. Also scanty dried up pastures. If pasture is poor, feed hay or silage. If hay or silage is poor, feed high protein grain.

What Grain Mix Goes With it?

With Excellent Roughage— use any combination of group A feeds that will make a palatable ration. For example, corn and cob meal and oats will supplement the high protein roughages in this class. Or you can use a single palatable grain such as oats. Use a grain mixture with 8-11 per cent protein.

With Good Roughage—Use a mixture that gives you more protein—11 to 14 per cent. Any of these mixtures will do;

900 lbs. of A feeds and 100 lbs. of D feeds

800 lbs. of A feeds and 200 lbs. of C feeds

500 lbs. of A feeds and 500 lbs. of B feeds

850 lbs. of A feeds, 100 lbs of B feeds, and 50 lbs. of D feeds.

With Fair Roughage—Use still more protein in the grain mixture —14 to 17 per cent. Any of these mixtures will do:

Straight 16 per cent dairy feed.
800 lbs. of A feeds and 200 lbs of D feeds

700 lbs. of A feeds and 100 lbs. each of B, C, and D feeds

650 lbs. of A feeds and 350 lbs. of C feeds

With Poor Roughage—Use a lot of protein in the grain mixture—17 to 20 per cent. Any of these mixtures will do:

700 lbs. of A feeds and 300 lbs. of D feeds

600 lbs. of A feeds, 100 lbs. each of B and C feeds and 200 lbs. of D feeds

450 lbs. of A feeds, 200 lbs. each of B and C feeds and 150 lbs. of D feeds

How Much Grain Should I Feed?

With Excellent Roughage

Holstein— Feed 1 pound grain for each 6 pounds milk.

Ayrshire, Brown Swiss, Milking Shorthorn—Feed 1 pound grain for 5 pounds of milk.

Guernsey, Jersey—Feed 1 pound grain for 4 pounds milk

With Good Roughage

Holstein—Feed 1 pound grain for 5 pounds milk.

Ayrshire, Brown Swiss, Milking Shorthorn—Feed 1 pound grain for 4¼ pounds milk.

Guernsey, Jersey—Feed 1 pound grain for 3½ pounds milk.

With Fair Roughage

Holstein—Feed 1 pound grain for 4 pounds milk.

Ayrshire, Brown Swiss, Milking Shorthorn—Feed 1 pound grain for 3½ pounds milk.

Guernsey, Jersey—1 pound grain for 3 pounds milk.

With Poor Roughage

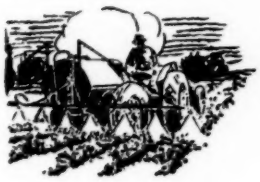
Feed more grain than for fair roughage—but even heavy grain feeding will not make up for what's lacking in poor roughages.

Just for example: "My roughage is fair—so I need a 14—17% protein mix. I can use 800 pounds of my corn and oats (group A above), and buy 200 pounds of linseed meal (group D above).

"That plan will get the most out of the feed I have."

Report on an amazing —

NEW PLANT GROWTH REGULATOR



Maleic Hydrazide stops potatoes and onions from sprouting in storage, prevents frost damage to fruit trees, stops grass from growing, dwarfs fruit trees . . .

Condensed from Rural New Yorker

Loren D. Tukey

ALTHOUGH it was first synthesized in Germany in 1895, it was not until 1949 that maleic hydrazide was shown by Drs. D. L. Schoene and O. L. Hoffman to have growth regulating properties. They reported that young tomato plants stopped growing for about two months after a spray of maleic hydrazide at a concentration of 2,000 parts per million (ppm). Growth subsequently resumed, but mainly from lateral buds.

Maleic hydrazide (MH) is unique among the common plant regulators in that it has growth-inhibiting properties, in contrast to the growth-promoting properties of napthalene-acetic acid, chlorophenoxyacetic acid and similar compounds. Maleic hydrazide inhibits terminal growth and elongation, destroys apical dominance, and stimulates lateral bud development. The other materials do just the opposite.

Since 1940, MH experimentation and evaluation have been largely to invent new applications for it to solve an endless list of agricultural problems, such as reducing frost damage to flowers, prolonging storage life of vegetables, controlling growth of fruit trees, grass and lawns, stimulating and preventing flowering, and eliminating weeds.

Delaying Time of Blossoming

In many fruit areas, the frequency of spring frosts, although not always completely eliminating commercial fruit production, may determine the difference between profit and loss. To reduce crop losses from spring frosts, various devices such as orchard heaters, smudge pots, wind machines, an "ice blanket", and paper coverings or caps have been used. However, if the blooming period of crops could be delayed beyond the frost period, the great expense and investment in mechanical frost protectors could be eliminated. Such was the think-

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ing of Dr. D. G. White of Pennsylvania State University when in 1949 he started treating various plants with maleic hydrazide to retard plant growth and delay the time of blossoming.

Tests were made on apples, peaches, cherries and on brambles. Although extensive tests were made on tree and small fruits, success was obtained only on raspberries. These plants sprayed with maleic hydrazide at a concentration from 50 to 500 ppm at the time when new leaves were about the size of a fingernail, were delayed in time of bloom from seven to 14 days, in proportion to the concentration used. Since raspberry blossoms develop on current season's growth, the danger of frost is normally of minor importance and thus blossoming delay is of little value. However, in delaying bloom, the time of harvest was also delayed, even though to a less extent. Thus, growers might find MH treatments useful in staggering the harvest season, especially when plantings are extensive.

Increasing Storage Life of Vegetables

In the storage of such crops as Irish potatoes, onions and sugar beets, sprouting is an important commercial problem. Not only is appearance impaired by sprouting, but quality is reduced. Excessive sprouting hastens decay. Although cold storage temperatures of 40 degrees F. or below and certain inhibitors applied after harvest will significantly reduce sprouting, frequently the availability and capacity of refrigerated storages are inadequate —and chemical treatment is impractical—with large tonnages.

Now, maleic hydrazide has opened an entirely new approach to sprout inhibition. Control of sprouting is now being obtained by spraying maleic hydrazide on the crop as a pre-harvest treatment with the inhibiting effect of the chemical carrying over into storage.

The first successful use of MH to inhibit sprouting on onions was reported in 1950 by Dr. S. W. Wittwer of Michigan State College. Sprays of 1,000 and 2,500 ppm of maleic hydrazide (two to five pounds of actual chemical per acre), applied to the onion foliage at two and 11 days before harvest, significantly reduced sprouting and root growth in storage without influencing yield. After eight months in storage, the control onions not-treated had approximately 70 per cent loss due to sprouting while those sprayed at 2,500 ppm had from none to 20 per cent.

Suggestions made by the chemical's manufacturer for onions are that MH-40 (40 per cent active maleic hydrazide) be ap-

plied from one to two weeks before harvest when bulbs are mature and tops begin to fall but still show green. Correct timing is particularly important; too early spraying is apt to cause breakdown of the bulbs. Suggested dosages are: for an acre, five pounds of MH-40 in 100-150 gallons of water; for less than an acre, respective fractions thereof; and for the home garden, four level teaspoons in two quarts of water for every 250 square feet.

Potatoes held at temperatures below 40 degrees F. to retard sprouting become sweeter due to conversion of stored starch to sugars. Such sweetened potatoes have poor cooking quality for table use and develop an undesirable brown coloring upon dehydration and for potato chip manufacture. Consequently, potatoes cannot be stored for any great length of time with retention of quality and without considerable loss from sprouting. Breakdown and decay are enhanced by excessive sprouting.

The growth-inhibiting qualities of maleic hydrazide have enabled the storage of potatoes at higher temperatures (55 degrees F.) without losses of product. Dr. Wittwer obtained complete sprout inhibition of Irish Cobbler and Pontiac potato varieties for seven months in storage at 45 degrees and 55 degrees F. by applying a single pre-harvest MH foliage spray at 2,500 ppm four to seven weeks before harvest. This was accompanied by no change in yield or tuber quality at harvest and by a retention of good processing quality in storage.

Controlling Growth of Fruit Trees

With the opening of leaf buds in the Spring, new shoot growth commences. At the terminal end of the shoot is a growing bud and laterally below it are located the leaves. In the axil of each leaf is a small dormant lateral bud that is capable of producing a shoot similar to that on which it is located. The amount of lateral bud activity is related to the dominance or ruling ability of the terminal bud. This phenomenon is known as apical dominance. Lateral bud growth can be stimulated or encouraged by inhibiting, killing or pruning off the terminal bud or dominance.

The writer found at the Pennsylvania State University that sprays of maleic hydrazide influenced the activity of fruit tree buds and the dominance of one bud over others.

For example, when new shoot growth four to six inches long was sprayed with maleic hydrazide at from 2,000 to 3,000 ppm, terminal bud development was inhibited (loss of apical dominance) with resulting stimulation of lateral bud growth. Generally, the terminal bud was arrested

permanently but, in some cases, the inhibition was only temporary. Lateral bud growth was stimulated not only in the terminal region of a shoot, but also further back along the branch on two,-three- and four-year-old wood. Resulting trees were bushy and dense, low in height and more spreading, and had considerable lateral growth in otherwise barren regions of a three- to four-year-old branch or limb.

These results on fruit trees have led to several lines of research and open still other avenues of investigation. Northern Spy trees, sprayed each Spring for the past four years with 2,000 to 3,000 ppm of maleic hydrazide when new growth is approximately four to six inches in length, are now dwarfed and bushier than the conventionally grown tree. This has suggested the possibility of dwarfing trees and encouraging bushy shoot growth. Further, young fruit trees and nursery stock void of low developing scaffold limbs might be encouraged to produce such scaffolds by inhibiting top growth in the Spring by a spray of maleic hydrazide. Frequently, where heavy pruning is practiced and/or water-sprout development is extensive on the inside of the tree, a spray of maleic hydrazide at 2,000 to 3,000 ppm, applied when sprouts are approximately six inches in length, has prevented further extension of the sprouts.

Nothing has created quite as much interest in growth regulators as the report by Dr. J. W. Zukel that the growth of lawns and grass could be retarded by maleic hydrazide, thus reducing the number of mowings and back-breaking work. Hence, maleic hydrazide has been suggested for use in trimming edges of lawns along sidewalks, flower beds, trees, fences, billboards, driveways and buildings. For this purpose Dr. Zukel has suggested using two ounces of MH-40 to one to 1.5 gallons of water, which is enough to spray a six-inch band over 1,000 feet.

In the Spring, treatment of turf should commence when the grass is two to three inches tall, and at other periods, one week before mowing. To reduce mowings of grass areas along highways, vacant lots and rough land, four ounces per two to three gallons of water applied over 1,000 square feet has been indicated. As a note of caution, maleic hydrazide should be used only on established turfs two or more years old, and then no more than two applications during the same season.

The inhibition of sprouting of carrots, radishes, rutabagas and other root crops has been demonstrated. Premature softening of apples reported to occur with some pre-harvest drop sprays ap-

pears to be prevented by maleic hydrazide in combination. Cut flowers treated with maleic hydrazide have been reported to hold up better and longer in storage.

Control of flowering with vegetable crops has considerable economic importance. Maleic hydrazide has stimulated bolting in celery, cabbage and lettuce, as much as two months on celery, at 50 to 100 ppm. Male sterility in corn and certain cucurbits has been produced by foliage sprays of maleic hydrazide when tassels were beginning to form and when female flowers were about a month old. This has received special attention in hybrid corn production.

Sugar beets often bolt in the field but, by spraying this growth inhibitor at 1,000 to 5,000 ppm, further development can be averted. Topping of tobacco (removal of apical bud and upper leaves) to promote better leaf development stimulated undesirable suckers from lateral buds. Frequently, these suckers or shoots have to be removed by hand once or twice before tobacco harvest. Dr. E. L. Petersen of the Connecticut Agricultural Experiment Station has shown that a foliage spray of maleic hydrazide effectively controlled suckering with no significant effects upon tobacco yield leaf quality or burning properties.

Maleic hydrazide is truly a unique growth regulator with special inhibiting properties that agriculture is going to hear more from in the future.

Drench Controls Sheep Parasites

Little price change from a year ago for fall-fattened lambs, but extra dollars for some operators as the result of a control for internal parasites in sheep, is the report from Oregon State College.

Large supplies of beef and pork will work against much improvement in fall and winter lamb prices compared with a year ago, M. D. Thomas, agricultural economist reported but close on the heels of the outlook came word that profit-cutting stomach worms in lambs can be held in check with inexpensive treatment.

Fattening lambs treated at Oregon State College last fall with phenothiazine drench to control parasites gained four times as much as untreated lambs. Treated lambs also gained higher, according to veterinarian Paul Allen and animal husbandman J. E. Oldfield.

FROM DRYLAND TO RANGELAND

Here is how they did it with sprinkler irrigation and reseeding . . .

Condensed from
Western Livestock Journal

Raymond Coppock

WHAT good is an insignificant flow of water — say 200 gallons per minute — to a cattleman with several hundred acres of dryland range and a 60-cow herd?

Since irrigated pasture is out of the question, most cattlemen probably would say "none."

Yet the operators of a Planada, California ranch with a limited water supply, Carlston Cunningham and his father, E. T. Cunningham, wouldn't take "none" for an answer — and by using sprinklers and a reseeding program adapted to the conditions, they have made a big difference in production of the range.

The first step, taken five years ago, was an experiment in getting the jump on fall rains with sprinklers. "Our herd calves early, practically all by the first of the year," says Carlston Cunningham. "That's why we were concerned with getting green feed as early as possible—we need it for milk production."

Starting with only a 10-acre plot, the Cunninghams have gradually developed their present 20-head sprinkler system which can cover 130 acres with an inch and a half of water every 20 days. In line with the limited water supply, the sprinklers operate at the least output which can be considered efficient — about five gallons per minute each.

Depends on Weather

"In the five years we've been experimenting with the system, we've consistently extended the grazing season, especially in the fall," says Cunningham. "It all depends on the weather, but we have usually added several weeks. This year, we started the fall sprinkling on Sept. 20. In the spring, it's no use trying to keep natural grass growing after May 20."

During their period of use—the critical weeks at the fringes of the regular growing season—the sprinklers don't deliver much

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Union Stock Yards, Los Angeles, California

water at any one spot, Cunningham admits. "Yet it doesn't take much to germinate the seed, or keep the old plants going," he says. "And a little green feed to go along with the dry in the rest of the field makes a lot of difference."

Until this year, the sprinkled acreage produced only natural grasses such as burr clover, wild oats and filaree. But now it looks as if another experiment may pay off.

In the fall of 1953, Cunningham disced 30 acres of the sprinkled area, cultipacked to break up clods and planted two lb. per acre each of crimson, subterranean and rose clover seed. He also put on 300 lb. of superphosphate per acre at planting.

Big Waggoner Ranch in northwest Texas has its own helicopter. When first purchased, it chased enough wild cattle out of the brush to pay for itself. Now, however, the cattle are accustomed to the helicopter, and sometimes must be prodded with a long stick carried by the pilot before they'll move. Everybody and everything — it seems — now take our technological advances for granted.

"That first winter we thought we had a fine crop of domestic clover," recalls Cunningham. "But it turned out to be nothing but a thick stand of burr clover."

Delayed Action

But this past winter, the delayed-action results were apparent. Cunningham estimates that, allowing for variations in spots, about 30% of the forage is crimson clover. Only traces of the other domestic varieties can be found. But where the clover is well established, natural grasses show marked improvement, too—apparently the result of nitrogen fixed in the soil by the legume.

Cunningham chose quick-growing varieties of annual clover to supplement his natural range grasses, partly because of their ability to supply nitrogen, but largely as additional green forage.

Of his entire setup, both sprinkling system and the seeding of clover, Cunningham says he's "not prepared to say that it pays." One disadvantage is high power rates as a result of the short irrigation season.

But in spite of his expressed caution, Cunningham plans to extend and enlarge his system. For the pay-off is plain to see: more feed, greener feed and, above all, a longer green-feed season.

G. I. Joe Made the Grapes Grow Again

It took "know-how" and a lot of hard work to rehabilitate a worn-out fruit farm . . .

Condensed from American Fruit Grower

Ford Quigley

THIS is the story of a G.I. named Joe Gruber who bought a little fruit farm after the war, studied fruit growing, and is now an up-and-coming grape grower in Ohio's productive Lake Erie vineyard section.

Joe's story is typical of many G.I.'s who are now growing fruit. Like most of them, he employs progressive cultural methods and keeps up with modern ideas in horticulture.

Yet in some ways Joe's story is unique. For one thing, the farm he bought was a semi-abandoned, worn-out place that called for a rehabilitation job that would have challenged an experienced fruit grower. Joe was inexperienced, and just beginning his on-the-farm training in horticulture.

The property that Joe bought in 1946 consisted of a small house without conveniences and 10 acres of grapes planted in 1920, and long-since neglected. The Ashtabula County farm had a good elevation overlooking Lake Erie. The land sloped gently to the north and ravines cut into the rolling hills. One big asset was the knowledge that it was a practically frost-free site.

Joe's training coincided with the introduction of new approaches and practices in grape culture. He was eager to test these new procedures in a young 3½-acre vineyard he planted in 1946. He planted vines 10x7 feet, and cut his posts 8 feet long instead of 7, setting them 2 feet into the ground. This gave him a 6-foot elevation for the top wire (No. 9 gauge). The second wire (No. 11 gauge) was stretched 3 feet below. By raising the top wire one foot Joe figured that 14 additional square feet of leaf surface was exposed to sun.

The semi-abandoned vineyard required a different approach. Joe uprooted several weak vines and filled in 400 vacancies with new plants or with extensions of

Reprinted by permission from American Fruit Grower, Cleveland, Ohio

canes from adjoining plants started to establish a new plant by layering.

Where posts have been replaced, the top wire has been correspondingly raised. The vines had been trained to a fan-type system which Joe has gradually changed to an umbrella-type system. He loops the fruiting canes over the top wire and ties them securely to the lower wire.

Many old trunks have been removed by replacing with younger wood developed from basal suckers. This renewal of trunks is interesting, not difficult, and highly rewarding.

Joe's main cultural practice has been the use of wheat as a cover crop. Under cover-cropping, the vineyard is disked from mid-May to mid-August. After the first disking, 500 pounds of 10-10-10 fertilizer are applied with a drill. He has leaf analyses made to determine his fertilizer needs.

Around the middle of August the cover crop is drilled in, along with fertilizer at the rate of 300 pounds of 3-12-12.

The wheat used for seeding in the vineyard has been grown on the farm for the past eight years. After combining the grain, Joe has about five tons of straw to use on two acres which are under a mulch program. He applies this mulch in July and leaves it until the next spring, when the vineyards are disked. This mulched acreage receives no cover crop, but it does get the 500 pounds of 10-10-10 fertilizer.

Before treatment, the soil was eroded and wind-swept. Vines were undersized, low in vigor and poor in color. Many were badly heaved and showed root branching. Joe has obtained remarkable results in checking erosion and renewing the vigor of the vines.

In the field of pest control Joe has had splendid results. Good air drainage has been a factor in controlling black rot. He has also controlled berry moth and leafhoppers, and there has been no mildew.

From 1947 through 1951 Joe used three pre-bloom sprays, one of Bordeaux and two of Fermate, followed by three post-bloom sprays of Fermate and DDT. Since 1952 only one pre-bloom spray of Fermate has been applied, with two post-bloom sprays of Fermate and DDT, and one of DDT and parathion, making four applications in all.

Besides his main crop of grapes, Joe has 4 acres of peaches. This is probably enough for diversification, since his farm is near an industrial area where he could find employment in ordinary times.

His total grape yield in 1954 was 95 tons. He got 92 tons from a 3-acre field bearing its

first crop. Some near-by growers have exceeded his yields, but probably none started with a vineyard in such low repair.

How can Joe increase his yields still further? A more vigorous program of vine renewal and trellis raising will help. Greater precision in balanced pruning would be certainly worth the extra time.

Growing — or purchasing — greater quantities of mulch to be subsequently disked in the soil is a "must." Increasing the amount of fertilizer used will be advantageous. More nitrogen in connection with a stepped-up mulching program will be necessary.

A decade after the war's end, Joe owns his farm and equipment. He has improved the residence, built a barn, cistern and farm pond, and repaired a garage and tool shed.

If Joe carries on with his vineyard as is now planned, one can't help wondering what the results will be at the end of another eight years.

FARM INVESTMENT NOW AVERAGES $14,000 PER MAN

Behind each of the 8½ million farm operators, hired hands, and family workers on United States farms, there lies an average capital investment of about $14,000, according to the U. S. Department of Agriculture economists.

This amount—four times the 1940 average per farm worker of $3,500—is invested in land, farm buildings, livestock and feed inventories, machinery and equipment, and cash for operating expenses. It does not include approximately $5,000 per worker invested in houses, automobiles, household goods, and savings.

Inflation has been the principal factor in the increase in dollar value of farm resources in relation to number of workers—the same resources would have been valued at $6,000 in 1940 dollars. But two other developments also have been responsible for this actual increase in resources per farm worker. Farmers have bought new machinery and equipment; they have added to their buildings; and they have improved their land a great deal. In addition, the number of farm workers has been shrinking and is now about a fourth less than in the years immediately preceding World War II.

Most striking is the increased investment in machinery and equipment. Average value of equipment at the disposal of each farm worker today is nearly $1,900, as compared with $200 worth of machinery and equipment per worker in 1940. *U.S.D.A.*

$ 2,000,000,000 Bird

The multibillion dollar chicken and egg business expects the 1960 hen to lay twice as many eggs as the 1930 model . . .

Condensed from Nation's Business

Gerald Movius

YOU may have heard a loud crow from the national coop not long ago when the U.S. Department of Agriculture announced that the average American laying hen is producing at the rate of 184 eggs a year as compared to 121 eggs in 1930. Ten years hence, the average layer may do the work of two 1940 models.

This is good news for the egg producer. A high-producing hen takes up no more room at the feed hopper than a low producer.

One reason for the 50 per cent hike in productivity in the past quarter century is better management of laying flocks—better rations, better housing, more attention to diseases.

The other reason is the better hen—a hen with a talent for laying that is bred into her bones. As her kind increases it is gradually replacing the less enthusiastic birds throughout the nation. On some commercial egg farms today a pullet must produce at the rate of 225 eggs a year, or it's off with her head.

By contrast to the widely publicized chicken of tomorrow and other busty types of bird developed for the broiling rack and roaster, this better-laying hen is virtually unknown to her public. And that's a situation out of kilter with the economic facts of the chicken business:

The egg comes first, accounting for more than 60 per cent of the industry's gross income.

Equally unknown are the men and women behind the better hen —the poultry breeders who specialize in the development of high-laying strains within the standard breeds and varieties.

As distinguished from the poultry keepers who supply the infertile breakfast egg, the breeders' stocks-in-trade are fertile eggs for the commercial hatcheries,

Reprinted by permission from Nation's Business, Washington, D. C.

day-old chicks and adolescent pullets for commercial egg farms and general purpose farms, and foundation breeding stock for poultry keepers who wish to develop their own strains.

It's an exclusive profession with a roll call in the low thousands, and its practitioners are case studies in contrasts. Their bent for genetics is balanced by a zest for competition. Some of them have strings of degrees in poultry husbandry and poultry breeding. Others never went to high school. They combine an infinite patience with a hearty belief in vigorous advertising, and they are free enterprisers right down to the last pinfeather on their youngest pullet.

The average breeder is a dreamer, artist, scientist, accountant, merchandiser and showman in one package, and above all he has a feel for chickens that compares to the green thumb of the better horticulturists.

> Only about a third of the farms in the United States are mortgaged and most of these for only a small part of their value, according to a study by the USDA.

In microcosm, the breeders' story is the story of a Single Comb White Leghorn hen named Queen Bess, address, Denison, Texas, the property of Mr. and Mrs. J. Kenneth Williams of the Williams Poultry Breeding Farm.

As Hen of the Year for 1954-1955 by acclaim of the Northeastern Poultry Producers Council, and High Hen of the 1954 National Egg Laying Contests, Queen Bess holds the two top honors that can accrue to any working chicken. Her biography illustrates the general working pattern of the poultry breeding business.

The story begins when Queen Bess emerged from the egg on Feb. 24, 1953. She was damp, bedraggled and notably unlovely. But destiny had already wing-banded her for a chance to rank among the immortals of the feathered kingdom.

There was no frying pan in her horoscope. She came of most distinguished ancestry, and the basis of the breeding art is the scientific fact that egg production talent is inherited. Her mother was Lady Iva who had laid 336 eggs in her pullet year. Her sire was Lord Nelson whose mother, both grandmothers and three of the four great grandmothers were all birds of the 300-egg class, and on both sides of the family she was kin to Queen Anne, a Williams bird who was the Hen of the Year for 1952-1953.

There was never the slightest

doubt as to the small Bess' identity, although the Williams incubators hold 104,000 eggs at a setting. Royalty and racing stables are no more finicky record keepers than are poultry breeders, and the breeding pen and trap nest system removes all chance of confusion.

Lord Nelson and his harem of 22 wives had lived in a numbered pen, shut off from all other matings among the 4,000 pedigreed leghorns on the farm. When Lady Iva entered a nest with intent to lay an egg, she tripped a control, and a small gate closed quietly behind her. In the nest she was trapped until released by an attendant who marked her egg as carefully as though he were footprinting a baby. The pen number, indicating the sire, and Lady Iva's personal number which she wore on an anklet, were recorded on the shell before the egg was removed from the coop.

There are five million dollars worth of nitrogen over every acre of land. Properly inoculated legumes are able to take some of this nitrogen out of the air and put it in the soil.

Six of Lady Iva's eggs were set on Feb. 3, cuddled together in one of numerous baskets in the incubator, each basket holding the marked eggs of one hen. Thus when Queen Bess dried off, fluffed out and began to take an interest in life, she found herself in company with two sisters and three brothers, all of which, to the unbriefed eye, looked precisely like the pale yellow chicks that decorate store windows in the Easter season. But there was an important difference. Unpedigreed chicks can be had for a nickel to a quarter. Lady Iva's daughters were worth $2 each and her sons $1.25 each at the moment they were hatched.

All that these blue-blooded balls of fluff had in common with run-of-the-hatchery chicks was a lack of appetite. The baby chick is the only bird in the world that carries its own lunch, and Queen Bess had enough food in storage to tide her over for two days, which is why American breeders can air express their chicks to buyers all around the world.

Bess was selected to remain at Denison as one of 3,000 pullets scheduled one day to replace the older hens in the breeding pens. The first human hands she ever saw placed a numbered band on her wing as part of the bookkeeping system that will monitor her life as long as she lives, and then she was enrolled in the nursery school for baby chicks that is the brooder house.

The future queen of the na-

tional chicken coop got no special favors. She scrambled for room at the feed hoppers. She fought beak-to-beak arguments with her classmates, and presently she began to trade her golden down for a frock of white feathers.

Along with the rest of her group, she suffered the painful indignity of vaccination for Newcastle disease and fowl pox, and she was graduated to the open pullet range and a carefree summer of chasing butterflies and sunbeams. By human standards, Bess was in her 'teens at two months of age, and her comb was beginning to grow into the flashy, scarlet bonnet that she wears today.

But girlhood is short for pullets on a breeding farm. By late August, Bess was back in the toils of the bookkeeping system, an initiate of the trap nest system—and just in time. For at six months and 17 days of age, she dropped her first egg, and Ken Williams began to think of her as a prospect for the National Egg Laying Contests in which his chickens have competed with success for nine years.

Mr. Williams' feel for chickens is combined with a master's degree in poultry breeding from Iowa State and almost ten years' experience as assistant professor of poultry husbandry at Idaho University. He took note of Bess' vigor; the bright prominent eyes; the stout beak on a broad head, and the rich yellow of her shanks. By all possible preliminary tests, the pullet measured up as a superior laying chicken.

Mr. Williams shipped Bess and 12 other pullets to the Oklahoma A. & M. division of the National Egg Laying Contests which are a cooperative venture of State Colleges of Agriculture, the breeders and leading magazines devoted to the poultry industry. All birds are entered by pens of 13 pullets each.

To poultry people, a Hollywood Oscar is a meaningless bauble compared to a trophy from the National Contests. The hurrah over Miss America is kid stuff, and the World Series? What's that? A winning breeder shouts his victory from his advertisements for months and sometimes years. It is, after all, serious business, because the egg is a multibillion dollar ($2,500,000,000 industry.

During the past eight years, lowest fall prices of No. 3 yellow corn at Chicago have occurred during the 44th week (about November 1) seven times and about mid-November once.

For 50 straight weeks, ticked off to the second, Bess lived as a bachelor girl careerist under

the impartial eye of college officials who are the referees and scorekeepers. No entry has an edge as to diet or attention. The scoring is identical at all divisions of the contests in which 11 state colleges participated in 1954, and the poultry press makes up the national final tallies.

While the glamor attaches to the High Hen, the breeders, for business reasons, are more interested in matching pen against pen and breed against breed, and there are numerous pen awards and breed awards, nationally and divisionally. Two of the most coveted trophies are offered by the *Poultry Tribune* of Mount Morris, Ill.

Entries from the Darby Leghorn Farm of Somerville, N. J., took both *Tribune prizes* for high average production in 1954. One Darby entry of six pens—78 birds in all—produced an average of 267.27 eggs per bird, while one of its pullets finished second only to Bess for High Hen.

Over the years, Single Comb White Leghorns, Rhode Island Reds, New Hampshires, Barred and White Plymouth Rocks have tended to dominate the contests, but Rock-Red Crossbreds are surging to the front, and such birds as the White Wyandotte, the Australorp, the Brown Leghorn and the Black Minorca consistently make respectable showings.

The contest knocks to smithereens a popular idea that the White Leghorn is just naturally the best laying chicken. A Barred Plymouth Rock was High Hen of the 1952 contests, and at the end of the fifth month in the current, 1955, contests a pen of Rock-Red Crossbreds entered by J. J. Warren of North Brookfield, Mass., was leading the field. Breeders have worked more intensively with Leghorns than any

National Grange Monthly
A Recipe
For Early Lambs

'In this system much depends on having the ewes take the ram in proper time for the Dublin market. In order to accomplish this seemingly difficult business, they treat the ladies with a cup of generous Wicklow ale, and drive them about the field, in order to create the proper ferment between their blood and the ale, and then at the critical moment let in the gentlemen. Some managers, more attentive than common, treat them with claret instead of ale: perhaps the swarms of children in the cabbins are owing to the prolific quality of this excellent ale of Wicklow.'—R. Young, 'Tour or Ireland,' 1780.

other breed in large part because of the fetish in some metropolitan markets for the white egg which has the same difference from a brown egg that a blonde has from a brunet and no other.

Theoretically, breeders could develop a high-laying strain with any breed or variety of chicken, and the average production per bird in the 1954 contests, counting all breeds, was 224.82 eggs and 233.83 points, points being determined by the weight of the eggs. This topped all previous records. Ten years ago, the birds averaged 201.25 eggs and 207.89 points.

The breeders aim at strains that will produce a greater number of the extra large eggs that now command a premium price at the shopping center.

Most of Queen Bess' output was in that grade. She laid 337 eggs in 350 days for a total score of 368.15 points, and when she was whisked off to the Northeastern Poultry Producers Council, she had a leg up on all other entries for Hen of the Year.

The High Hen is not automatically the Hen of the Year. While her production points counted heavily, Bess still had to be judged on the basis of "conformity to standard breed qualities." For beauty, as it were, as well as for brains. She had to be weighed, to have her feathers examined, her stance appraised and the points on her comb thumbed over by the experts.

At Denison, the Williams family haunted the radio for news as the show progressed. Word finally came that Bess was living in the Golden Cage reserved for the Hen of the Year.

The feathered center of attraction, however, was untuckered and unperturbed by the glare of flash bulbs or the admiring thousands who shuffled by her glittering quarters. She gave them all a beady stare—and laid an egg. Possibly she enjoyed the fuss, because Bess is a sociable chicken and not easily flustered, which is another mark of the distinguished producing bird.

Today, at home in Denison with her quest for fame behind her, Queen Bess is one of the wives of Captain Decatur, a vigorous, older cock who already has daughters who have produced more than 300 eggs in their pullet year. Only the top birds on the Williams farm are named, and the hens run to queens and the cocks to naval officers.

Henceforth, and as long as she lives, every egg Bess lays will go to the incubator, because her destiny is to produce daughters that will outdo her in production and sons that will transmit the family talent to her granddaughters. As there was no frying pan in her horoscope as a baby chick, there is no stew pot in her future.

Social Security For The Farmer

After January 1st, most farmers can "join" Social Security for the first time. Here's what it means to you . . .

Condensed from Soil and Water

John D. Bennett

ON the first of January, most of the farmers and ranchers in this country can make social security reports for the first time. Their earnings after 1954 up to $4200 in a year will be credited to their individual social security accounts and they will start building old-age and survivors insurance for themselves and their families.

Most of us think of social security only in terms of a pension when we retire at age 65 or later. That, however, is only part of the story. Under the life insurance feature of this plan, cash payments ranging from $30 to $200 a month will be made to our families after our deaths. For most of us, this is even more important than the promise of a monthly check when we retire. But let's take a good look at the mechanics of this plan to see how it operates.

Perhaps our first question should be—"I'm a farm operator. How do I know whether I am eligible for this protection?" The answer is this: If you are a self-employed person who operates a farm, ranch, or other agricultural business, you are covered by social security on and after January 1, 1955, if your yearly net profit is $400 or more.

This is the only rule which is used in deciding whether you are "in" or "out." The law doesn't give you a choice on the question.

So you're now covered by social security? Then you ask, "What is the first thing to do as a policyholder in this federal family insurance plan?" and the answer is—"Get a Social Security Card." Your postmaster will give you an application blank, and he has the address of the nearest social security office that issues cards. If you already have a social security number, use *it*. Don't get a new number. If you once had a card but lost it, tell your secial security office that you

Reprinted from Soil and Water, 264 Texas Street, Waco, Texas

want a duplicate.

Early in 1956, as a part of your Federal income tax return you will make a social security report of your 1955 earnings. If your profit is $400 or more for the year, you must file the social security report with the District Director of Internal Revenue. The tax for self employed people is 3 per cent. If your profit amounts to more than $4200 in a year, you pay the tax only on $4200. Your personal social security number must appear on this report so that your individual account can be properly credited. Your benefits at retirement or the benefits for your family will be figured from this account.

And speaking of benefits, do you know the different types of social security payments? Payments may be made to an insured person at age 65. In addition, there are benefits payable under varying circumstances to wives, widows, children, and to aged dependent husbands, widowers and parents. Plus a benefit called a lump sum payment which is payable when an insured person dies.

How about this business of being *"insured"* before you are eligible for benefits? What kind of a test is this?

An insured person is one who has worked in employment or self-employment covered by the social security law for a required period of time. The amount of time required is not the same for everyone; it depends on the date you become 65 or on the date of your death if you don't live to be 65. It varies from 18 months to 10 years.

Self-employed farm operators who will come under social security for the first time in January 1955 must earn social security credits for at least a year and a half before they are "insured" for benefit payments. This year and a half time test holds good for old-age benefits only if they are at least 63½ on January 1, 1955. Additional time is required for younger workers to get retirement payments.

Fortunately, the law doesn't set a top age limit. If you are now 65 or over and can farm for at least a year and a half, that is, through 1956, you'll be able to claim your payments at the end of that time.

The really BIG question concerns the amount of the social security payment which will be due you or your family. Your average monthly earnings in employment or self-employment will govern the amount of your benefits. The two are tied together. The tables below will give you an idea of the benefits which are available to farmers (both self-employed and hired workers) and their families under the NEF social security law.

After reaching 65 and becoming entitled to old-age insurance benefits, you don't have to sell your farm or quit work completely to receive your social security benefits. You may have combined earnings from covered and non-covered work—as a hired person or self-employed person—of as much as $1200 annually and still accept your checks. If you earn over $1200, benefits for some months may not be payable depending on the amount of your earnings and the months in which you work. Income from investments, interest, or other insurance is not counted in figuring your earnings. At 72 you can get benefits regardless of the amount of your earnings.

That's the story on "Social Security For the Farm Operator," except for one last word. It's likely that you'll have a number of other questions about social security as the days and months go by, so just remember this: The best place to get complete and correct information about social security is your social security office and there is one not too far from where you live.

SOCIAL SECURITY RETIREMENT BENEFITS

Average Monthly Earnings	Worker's Monthly Benefit	Worker and Wife
$ 50.00	$ 30.00	$ 45.00
100.00	55.00	82.50
200.00	78.50	117.80
350.00	108.50	162.80

SURVIVORS BENEFITS

Average Monthly Earnings	Widow at 65	Widow — (any age) and 1 Child	Widow — (any age) and 2 Children
$ 50.00	$ 30.00	$ 45.00	$ 50.20
100.00	41.30	82.60	82.60
200.00	58.90	117.80	157.10
350.00	81.40	162.80	200.00

Our $10,000,000 Mushroom Crop

It takes know-how to grow good mushrooms, but they are a profitable crop . . .

Condensed from Pennsylvania Farmer

Thomas Johnston

THOSE oblong cinder block buildings which travelers see from U. S. Route No. 1 near the Kennett Square area of Chester County, Pennsylvania, house the bulk of a $10,000,000 mushroom business. Pennsylvania produces five times more mushrooms than the second most productive state, New York.

So far as outward appearances go, this type of farming does not resemble grass-and-cow farming, nor yet corn-and-hog farming. But under the surface lie similar scientific ways to grow the crop. Big problems also loom for the industry in gaining new markets.

Probably the mushroom represents our only important food-producing plant which botanists classify as a saprophyte, a plant which takes its living from dead and decaying organic matter. As a saprophyte, it is lacking in green color of chlorophyll, does not need direct sunlight as other plants do. Green plants like corn depend upon the energy of sunlight and make that energy available in food to animals and people. Mushrooms also make food available to people, carrying a high amount of nutritive value as well as being a delicacy prized by gourmets. The food thus made available by mushrooms has its origin also from the sun's rays, coming by way of other plants upon whose decaying remains the mushrooms feed, along with animal wastes.

With highly fertile soil as a basis, along with other favorable conditions, a corn crop may yield one hundred bushels per acre. Compared to this, a mushroom crop in properly made compost, plus other good conditions, may yield three pounds per square foot of bed. That's 130,680 pounds per acre as compared to 5,600 pounds of corn for a 100-bushel crop. Three pounds per square foot represents a yield which, under normal prices, puts the grower well upon the profit side of the ledger.

Reprinted by permission from the Pennsylvania Farmer, Pittsburgh, Penna.

Because of the basic importance of compost and its high cost and the large amount of labor needed to fill a house for growing, much scientific study has gone into making compost from many different materials.

Science of Compost Making

Horse manure, the tested and preferred raw material, has decreased in supply for many years, though in more recent years at a slackened rate of decrease.

Composting of manure may be compared to a ripening or purifying process, necessary to bring the mass of material into hospitable condition for the development of the undersurface mycelium of the mushroom. The mycelium is the vegetative stage of the mushroom, which precedes the "break" by which the edible parts of the plant push their way above the surface. Uncomposted or fresh manure contains a wide variety of fungi and bacteria, voracious feeders and rapid breeders, which dominate the early stages of decay. Cultivated mushrooms cannot compete against these organisms for food, nor are the early stages of decay conducive for cultivated mushrooms in other respects. After the "wild" fungi and bacteria have passed the peak of their power, compost becomes a hospitable growing medium for cultivated mushrooms.

Large vs. Small Piles

Under the older, conventional method of composting, which still has wide acceptance and use, material to be composted was built into large square-sided piles, reaching a width of 20 to 50 feet and a height of five to six feet. These piles were composted for a period of 28 to 30 days, with four turnings timed at weekly intervals.

Examining this composting process, as the heart of mushroom culture, researchers sought to refine and improve this basic method, while keeping costs within their usual range or even lowering them. Two scientists, Dr. J. W. Sinden and Dr. E. B. Lambert, have made notable contributions to practical compost making through studies and experiments. As a result of their findings many growers use smaller piles of compost with a proportionately larger area exposed to the air than is the case with larger piles. This in turn means more bacterial action taking place in the presence of oxygen, known as aerobic decay, and correspondingly less anaerobic action.

When one considers that the turning of compost piles introduces aid to the inside of the pile, and brings the interior of the pile to the surface for aeration, it is at once apparent that smaller, better aired piles represent a potential saving in labor

and expense. This has proved to be true in practice with compost suited for mushroom growing produced in a shorter period at a lowered cost.

Although composting is here cited as the central problem of growing the cultivated mush room, Agraricus Campestris, many other phases of growing likewise need to be carefully studied in a scientific manner. Such phases of the subject as humidity control, control of diseases, and economical production cannot be said to be less important than compost making, since each contributes its share to the production of mushrooms.

Rules For Mastitis Control

There isn't any "miracle cure" for mastitis in dairy cows.

But a methodical control program can get rid of this costly infection in any herd, says Joseph Simon, University of Wisconsin veterinary scientist.

He urges an 8-step procedure wherever mastitis shows up:

1. Have the entire herd examined by a veterinarian. He will examine the udders and arrange for laboratory tests of quarter milk samples. Then you'll find many of the "carrier" cows, and most of the infected ones.

2. Put the infected cows in a part of the barn by themselves, and treat them with a recommended drug. If some of the cows don't respond to continued treatment, it's best to sell them for slaughter.

3. Raise your own replacements, so that you don't buy somebody else's trouble.

4. If a cow shows mastitis signs, milk her last. Then you'll control the spread of any infection.

5. Use disposable paper towels, and wash the udders with a disinfectant solution before milking.

6. Disinfect the milker cups between cows. It's best to have two pails of disinfectant—one for udders, and one for teat cups.

7. Remove the milker as soon as milk stops flowing to avoid any danger of injury from creeping cups. Try to train the cows to milk out clean in three to four minutes.

8. Make sure the cows have plenty of stall room. If the cows are cramped for space, you're inviting injury to their mammary systems. Use plenty of bedding, and keep the barnyard free of wire, sticks, and stones.

Wisconsin Extension

New "Mulch Mat" Stops Erosion

The McSweeney brothers of California may have the answer to better management of your stubble mulch problems . . .

Condensed from Farm Management

A NEW stubble-mulch method of preparing grain crop seedbeds and two new implements to do the job have been developed by Eugene and John McSweeney on their diversified farm near Hemet, California.

First-year results show the method definitely reduces erosion, cuts tillage costs, and probably increases yields. So the techniques and tools are worth careful study by grain and seed growers in all shallow, sandy soil areas.

The McSweeney brothers are veteran farmers, but they keep their management methods young and up-to-date.

The new stubble-mulch, shallow cultivation method is a case in point. It was developed primarily to stop heavy losses of topsoil in areas subject to erosion. This it did, but it also reduced the number and extent of seedbed preparation operations which cut costs. The shallow planting it made possible also let them improve their fertilizer application method and get better yields. They can't quote any direct yield comparisons because conditions varied so in the "before" and "after" years that figures are meaningless, but John McSweeney is sure that production is upped materially.

Let's follow the McSweeney operation around the calendar and see how it is done. First, you should know that this is an annual cropping operation under sprinkler irrigation, and that the two principal crops are Kanota oats and Mariout blue barley grown mostly for seed.

In the late summer, usually in August, when the stubble is dry and brittle, the brothers send in a tractor pulling a drag to break the roots loose and crush the stalks into short lengths. The drag is comparatively light. It is made of miniature railroad rails welded on top of strands of ¾-inch

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to 1-inch wire rope. The rails run at right angles to the direction of travel and the rope strands, spaced at about two-foot intervals, run parallel. The drag is approximately 10 feet wide and 30 feet long, and when pulled over the stubble it has a rippling, snake-like action which helps distribute the straw evenly over the field.

Once over is usually enough, but in extremely heavy stubble or where piles of straw from the combine get bunched, they either go over the field a second time or hit the heavy spots with a buck rake. Even twice over, the operation is less expensive than plowing. McSweeney's records show it costs only 50 to 75 cents an acre to go over the stubble once with a 30-foot section of drag pulled by a wheel tractor at about five miles an hour.

This operation breaks up the stubble exceptionally well, but it has a plus value. Volunteer grain and weed seeds are covered so they sprout quickly with the first fall or early winter rain.

Immediately after the sprouting, another unorthodox grain tool enters the field. It is a rotary-hoe type cultivator, designed by the McSweeney brothers and built in a local shop.

This tool works only about 1½ inches deep and its primary purpose is to bring all straw and organic matter to the surface where it floats like a mat on top of the ground, protecting against rain and sprinkler erosion.

About three or four days later the crop is planted. This is done by a standard grain drill set on 14-inch spacings with fertilizer banding shoes set ahead of the planting shoe at a depth of 2½ inches. The trailing shoe covers the fertilizer band and deposits the grain seed on top at a depth of 2½ inches. The mulch mat is disturbed as little as possible during the planting.

Ammonium sulfate and ammonium nitrate are the fertilizers of choice and they are applied at the rate of about 50 to 60 pounds of available nitrogen. No further fertilization is done. The McSweeney brothers find that this method requires no more fertilizer than their former plowing method, since no effort is made to decompose the mulch mat. Left on top of the ground, it does not tie up any nitrogen and leaves the entire application to benefit the crop as the roots penetrate the band.

Obviously, the method is best-suited to shallow, sandy soils, but John McSweeney concludes:

"From what I have seen, I am convinced that the method has more than sufficient possibilities to merit experimentation on heavier soils in other areas."

Cattle Grub Control

Here are the most accepted practices for grub control in cattle . . .

Condensed from The Cattleman

C. F. Stiles and Newton W. Flora, Oklahoma A. & M. College

EVERY year grubs in cattle cause losses to farmers, ranchers,dairymen and other members of the livestock industry amounting to an estimated 50 to 150 million dollars.

The principal losses are: 1. Infested animals are slow to gain or may even lose weight. 2. Milk production in dairy herds may decline as much as 15 to 25 per cent. 3. Value of hides are much reduced as a result of the holes cut in the skin along the back. 4. Reduced value of the carcass as a result of trimming to remove the grub cyst. 5. Cattle may be injured as they attempt to escape the adult flies during egg laying time in the spring. For only a few cents a head, cattle can be treated for grubs and these losses prevented.

Rotenone is the only insecticide recommended for grub control. The most common and economical source is cube or derris powder. To be used in the formulas given here, the powder must contain at least 4.5 to 5 per cent actual rotenone. Many questions are being asked relative to the use of the newer materials. To date none tested have compared favorably with rotenone in grub work.

The rotenone can be applied in several different ways, any of which will give a good kill. The hand methods are somewhat slower than spraying or dipping, but are usually more practical for treating small herds.

Regardless of which method is used, however, the rotenone must be inside the grub cyst for a kill to result.

Dusting

Mix one pound of five per cent rotenone powder with two pounds of dusting sulfur. Apply the powder with a shaker made by punching 12 to 15 one-fourth inch holes in the lid of a wide mouthed quart fruit jar. Rub the

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powder into the hair coat by using a rotary motion of the finger tips. This will give better results than if a brush is used to rub it in.

One pound of the mixture will treat four to five head of adult cattle.

Hand Wash

On windy days, a wash is more convenient to use than the dust. Mix ¾ pounds of five per cent rotenone powder and three tablespoonfuls of soap flakes to each gallon of water. Wet down the grub area of the back with a pint of the mixture, and rub in with a stiff-bristled brush.

Spraying

Spraying will usually give best results when treating large herds. Use 7½ pounds of five per cent rotenone powder to 100 gallons of water. Operate at a nozzle pressure of at least 300 pounds, but not greater than 400 pounds. Hold the nozzle 12 to 16 inches from the back, and direct the spray straight down on the grub area.

About three to four quarts of mixture is used per animal.

Dipping

Dipping vats can be used for grub control, but normally the percentage of kill will be somewhat lower than that received from spraying. To charge the vats, use 7½ pounds of five per cent rotenone powder and 10 pounds of wettable sulfur to each 100 gallons of water.

The first treatment should be applied about two weeks after grubs begin to appear in the back and make the breathing holes. Since grubs will continue to appear in the back for about 100 days, and since each grub stays there four to five weeks, three treatments applied 30 days apart are necessary for control. Under Oklahoma conditions, these are usually applied about the first of December, first of January, and first of February. The earliest date of grub emergence may vary considerably from year to year. Checks for appearance of the first grubs should begin not later than October 15.

Control cannot be expected unless all three treatments are applied.

Best Quality Seed Costs Less

Price alone is not the way to determine the quality of pure, live seed. Cheap seed with a large amount of trash and a low germination rate may actually be more expensive than seed that's certified to have low trash content and high germination ability. It's the pure, live seed in every pound that will germinate and give a crop.

What You Should Know About LIVESTOCK MARKETING

Condensed from The Young Farmer

W. M. Sorem

LIVESTOCK marketing is important business. Ask any farmer who has cattle or hogs that are ready to be sold. He knows that a change of even one cent per pound can make a big difference in the profit that he makes on his farming. If he is an average farmer, about one-third of his total income will be accounted for by the sale of his livestock, so he can't afford to make many mistakes when he sells them.

You have three choices when you select your method of marketing. You can ship to a terminal market, sell at an auction, or sell directly from the farm to a packer-buyer or a dealer.

The terminal markets started in the early nineteenth century. The early rancher found that he could get only 50c a head for his cattle at his ranch. But the same cattle would bring $20.00 a head at the rail heads. And that's what started the long cattle drives along the famous old trails.

As herds of cattle appeared at the shipping points, it became necessary to provide facilities for feeding and holding the animals until they could be sold and loaded into railroad cars. These railhead stockyards set the pattern for the first terminal markets.

The first formally organized terminal market was established in Chicago in 1865. Many others sprang up, and today there are 66 of them scattered across the country. They account for most of the federally inspected meat that is slaughtered. In fact, the federally inspected packers reported that in 1950 they obtained 75% of their cattle and 40% of their hogs from the terminal markets.

These 66 markets and 256 auction markets are posted (supervised and regulated) by the Secretary of Agriculture in accordance with the provisions of the Packers and Stockyards Act of 1921. This act asusures you of having a free and open market

Reprinted by permission from The Young Farmer, published by General Mills, Inc., Minneapolis 1, Minnesota

where you can sell or buy livestock without fear of unfair practices. Under the law, market supervisors representing the Secretary of Agriculture must be present at all posted markets. These men make sure that sales agencies maintain surety bond to guarantee payment for livestock. They also supervise sale practices and regulate all marketing charges. In addition, the supervisors check the accuracy of market news reports, make sanitation inspections, and establish grade standards.

Also on hand are veterinarians from the Bureau of Animal Industry. They cooperate with state veterinarians in inspecting all stock that leave and enter the yards.

Shortly after these big yards were established, the livestock dealer and the local buying station for packers came into prominence. Both of these agencies buy livestock directly from the farm. The livestock dealer buys livestock from many farms, collects a shipment, and sells through a terminal market or directly to a packer. He provides the services of trucking and sorting your livestock and he can economically handle small numbers by making up larger shipments. Livestock dealers were most numerous during the depression years, but there are many still operating today.

The local buying stations for packers are a different story. They buy the animals directly from the farm as do the dealers, but in this case, the animals go directly to the packer immediately after purchase. Most buying stations are located right in the livestock producing regions. Some buyers come out to the farms and pick up the livestock. Others maintain only a small loading dock and pens in a town. When the terminal markets grew and expanded, the local buying stations passed into the background. Today, however, they account for large numbers of livestock, particularly in the hog producing regions of northern Iowa and southern Minnesota. The packers have moved their buying stations closer to the hog farmer and have made it easier for the producer to sell his livestock directly.

The third method of selling livestock is the auction market. There are about 2,400 such markets in the United States today. Of these, 256 are posted by the Secretary of Agriculture and come under the same rules that govern the terminal markets. The auction market for livestock works the same way as any kind of an auction. The owner brings his livestock to the sale area and the bids are taken by an auctioneer. These markets are now concentrated in the South and South-

east where they account for well over half of the livestock that are sold. They are strong in this region because of the lack of other forms of markets.

The auction market and the livestock dealer have another function in addition to channeling livestock to the packer. They provide a means for selling breeding and feeding livestock within the community and between

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retary of Agriculture to protect the buyer, the seller, and the ultimate consumer.

The terminal market also has disadvantages, however. It may be a considerable distance from you, which means higher transportation costs. And the livestock must be sold soon after arrival since it is expensive for the owner to delay in the sale for several days.

At first glance, the yard seems to be a maze of men, livestock pens, alleys, and equipment. However, it is a highly organized operation, designed to efficiently and quickly handle the large number of livestock that pour through every day. In addition to the government services, there are several private agencies that are involved. Each of these per-

ers prefer to let a commission agency handle the sale for them. They feel that the expert services are well worth the small fees charged.

Commission firms are required by the stockyards and the Federal government to maintain a surety bond. This bond protects you against default and insures you that you will be paid for any

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The auction market and the livestock dealer have another function in addition to channeling livestock to the packer. They provide a means for selling breeding and feeding livestock within the community and between communities.

Since the majority of livestock find their way to the consumer by way of the terminal market, lets take a further look at the operation of these large stockyards.

The terminal market has several inherent advantages to the seller of livestock. Because it has a large supply of animals, it attracts many buyers. It is highly competitive because many buyers and sellers come together in one place. Convenient transportation facilities assure rapid handling and ease of consignment. In addition, all of these markets are supervised closely by the Secretary of Agriculture to protect the buyer, the seller, and the ultimate consumer.

The terminal market also has disadvantages, however. It may be a considerable distance from you, which means higher transportation costs. And the livestock must be sold soon after arrival since it is expensive for the owner to delay in the sale for several days.

At first glance, the yard seems to be a maze of men, livestock pens, alleys, and equipment. However, it is a highly organized operation, designed to efficiently and quickly handle the large number of livestock that pour through every day. In addition to the government services, there are several private agencies that are involved. Each of these performs a specific service for you.

The first of these agencies is the stockyards company. This company owns all the physical facilities, furnishes all the feed and water, and cleans and maintains the yards. The best way to describe its role is to say that it operates a huge animal hotel. It never takes title to the stock, however, and it is never directly involved in the sale.

These yards are open to everybody. If you wish, you can obtain space from the stockyards company and handle the sale yourself, thus saving the commission fees. However, most owners prefer to let a commission agency handle the sale for them. They feel that the expert services are well worth the small fees charged.

Commission firms are required by the stockyards and the Federal government to maintain a surety bond. This bond protects you against default and insures you that you will be paid for any

livestock sold by a commission firm.

The job of the commission firm is to provide you with expert selling service. It is your representative in making the sale to the buyer. The commission that it charges is based on a scale that is approved by the U.S. Department of Agriculture. These charges are assessed on a per head basis. The commission firm is eager to obtain the highest possible price for your animals because it is competing for your business with other commission firms and other forms of marketing. At the South Saint Paul livestock market, for example, there are 27 of these commission firms. Each firm is entirely dependent on selling animals for its income.

In return for their commission, the firms care for, feed, and then show your livestock to the best advantage to the buyer. The commission man who takes your place in the sale transaction gives you the services of a man who is an expert in selling livestock.

The buyer must also be an expert in appraising the value of livestock. In addition to being a top livestock judge, he must be well versed on the conditions of the market, not only at his own location but across the country as well. Each morning he receives orders from his company as to how many cattle, sheep, calves, or hogs to buy, and the approximate price to pay.

Both the buyer and the commission man are livestock experts. If either of them is more than ½% off in estimating any of the factors of value, he is not likely to keep his job very long.

Even after these two men have estimated the weight, grade, and dress of the animals, they still must determine the final price. Here is where supply and demand come into the picture.

Government market reports estimate how many cattle will be shipped to the market. This estimate, called a forecast of receipts, is available to both buyer and seller.

The buyer knows that if there is a shortage of stock at the market, he will have to pay a higher price to get the number that he needs. If he doesn't offer a high enough price, the other buyers will take the supply and leave him short.

The seller, your commission man, has the same information about the expected supply and he also knows about how many animals the buyers will be needing. So he forms his own opinion as to the price that he can get for you. Another factor that complicates the picture is that many of the buyers are representing national packers so they can buy livestock at almost any market in in the country.

This means that if hogs are

high at Chicago, the packers may try to buy at Sioux City or South Saint Paul. This is one reason why the national market news services and the livestock forecasts are so important.

Before the buyer ever goes to the pens assigned by the stockyards company to the commission firm, he knows about what he will have to pay to get the animals that he wants. At the same time, the seller has a definite idea as to the price he can get from the buyer. As a result, they usually agree very rapidly on a price.

However, if the seller does not feel that the buyer has made a satisfactory offer, he will hold the animals and wait for another buyer. The price for a given grade remains fairly constant throughout the day unless there are some unusual developments.

Actually, the fees charged by commission firms are reasonable when you consider the value of their services. Commission men weigh the many factors in the market picture and quickly reach a highly accurate pricing decision. If you were to do this job, you would have to study the markets year round.

When the commission man decides that he has the highest price that he can obtain, he agrees to the sale. This may be a nod of the head, a wave of the hand, or a verbal response. In any case, there is no written record exchanged of the sale. The word of both the men involved is as good as their bond. This is considered one of the highest moral codes of the yards, and violations are practically unheard of.

After the sale, the animals are driven to the scales for weighing. The scales in the public market are periodically tested under the supervision of the United States Department of Agriculture to assure you of accurate weights. A copy of the weigh slip is given to the buyer and another copy is given to the commission man. Each of them forwards his copy with the record of the sale to his office. As the animals leave the scale, they become the property of the buyer.

The animals may be slaughtered in the same general area, or they may be shipped to other packinghouses. If they are classed as feeders, they will be shipped to farms for finishing.

Your check for the livestock is made out as soon as the commission office receives the notification of the sale. In most public terminals the check is mailed out the same day. If you accompany your animals to the market, you can usually pick up the check before you go home.

At present there is a trend toward marketing more livestock through local outlets, and fewer through the large terminal mar-

kets. Farmers are doing this because the local operators have lower overhead charges and are often able to perform the marketing services cheaper than the big markets.

Authorities do not expect to see this trend go very far, however, because it strikes at the heart of our marketing system—the market news report. As markets get smaller and more numerous, the task of reporting market prices all over the nation gets tougher. And when the market reports become vague or inconclusive, the large terminal markets are often the only places where the farmer can safely assume he is getting top prices.

One trend to watch, however, according to many marketing experts, is the movement toward paying for livestock by the carcass grade. Under this system, the sale of the animal is not completed until the carcass is put on the scale. There are many problems involved in this system, though, and no one expects it to be adopted overnight.

BORER-RESISTANT CORN BEING DEVELOPED

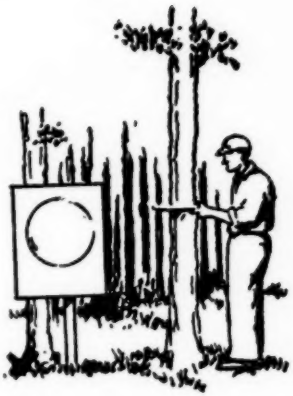
The European corn borer will find itself with no corn to bore, if cooperating Iowa and U. S. Department of Agriculture scientists have their way.

Working at Ankeny, Iowa, scientists are developing strains of corn able to resist attack by one of the crop's worst enemies. They expect to be ready to release such corn to growers by 1960.

A successfully resistant corn would not only reduce the $100 million annual crop loss caused by the borer but it would also eliminate the effort and expense of mixing and applying insecticides used against this pest.

Producing a resistant corn has been made more difficult by a spread across the Corn Belt during the 1940's of a corn borer able to produce two broods of young, instead of one, in a season. This means the corn must be resistant or tolerant to attack at all stages of its growth. It is the larvae, or young insects, that attack the corn plant by boring into leaves, ears, and stalks to feed.

Several inbred lines of corn with some degree of borer resistance have already been developed. The harder part of the job lies ahead —crossing resistant and susceptible strains to produce borer-resistant hybrids that possess other desirable characteristics such as good yield, disease resistance, and standability. *Iowa Extension*



GOOD LUMBER PILING PAYS OFF

Careless handling of lumber means loss of profits . . .

Condensed from
American Agriculturist

Lawrence S. Hamilton,

THE lumber pile on the average farm is a sorry spectacle. Quite often lumber dumped off or thrown off the truck is simply left where it falls.

When dealing with lumber fresh-sawn from the log, proper piling for air drying is essential. Even where so-called "dry" lumber purchased from the mill is concerned, care in piling is important. Cupped, twisted, bowed and badly checked lumber can result from lack of regard for the principles of satisfactory seasoning of wood. The elimination of these common defects is attained chiefly by holding the lumber firmly in proper alignment and by controlling the rate of drying. These controls can be effective only in a well constructed lumber pile.

The bottom tier of lumber in the pile should be at least 18 inches off the ground to permit adequate air circulation under the pile. This means that you must make some type of pile foundation. The principle requirements of a foundation are firmness, durability, slope and a height sufficient to permit this air circulation. Where the foundation is made of wooden piers or sills, the wood should be of a durable species or else treated with wood preservatives. Slope the foundation from front to rear at the rate of 1 foot in 12 feet. Set up the foundation on a well-drained site that permits good air circulation. Remove brush and weeds from around the pile bottom.

Some species of wood will dry much faster than others without resulting defect. It is, therefore, important to put only one species in each pile so that drying can

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be regulated to conform with the characteristics of the species. Sort the lumber so that only boards of the same thickness are put into the pile. The lumber should also be length-sorted, and if it is not possible to devote one pile to one standard length, at least have the largest material on the bottom, with the lengths decreasing as the pile goes higher. This eliminates the overhanging and bending of long boards.

Rate of drying is controlled to a large extent by the space between boards in the tier. A species like beech which checks and warps if dried too fast should have less space between boards than pine, which dries fairly fast without defect. The spaces between boards in a tier generally vary from about one inch to six inches.

The layers or tiers of lumber are separated from each other by stickers, when lumber is properly piled. These strips should be uniform in thickness (about 1 inch) and thoroughly dry. If the stickers are not of uniform width the boards will warp while seasoning. If the stickers are not dry, staining of the lumber may result. Sometimes it is advisable to use 2-inch stickers in the lower half of the pile and 1 inch stickers in the upper half. This speeds up drying in the lower part of the pile. The more stickers used, the slower the drying and more firmly is the lumber held in position.

Alternate exposure to sun and rain will play havoc with the upper tiers of lumber unless they are protected by a covering of some sort. Make the roof out of low grade lumber. Give the roof sufficient pitch to allow run-off of water, and allow it to project well over the front and rear of the pile. It should also be raised well above the top tier of lumber. In a windy location, fasten the roof to the pile by wiring.

To prevent or reduce end checking of thick stock or species which tend to check badly, end coatings may be used. Paraffin makes a good end coating. Hardened gloss oil mixed with barium sulfate and magnesium silicate is a cheap, excellent end coating.

Further information on the air seasoning of lumber may be obtained from your Extension Forester, State Forester, or many local wood using industries. The extra time and trouble required to pile your lumber properly pays off in dividends of dry, true lumber, free from serious distortion, checking and staining.

We Can Get 150 Eggs per Turkey Hen

To meet the increasing demand for hatching eggs at all seasons of the year, high, persistent egg production has become an important factor . . .

Condensed from Turkey World

C. W. Knox

CAN we obtain an average of 150 or more eggs per turkey hen? I believe we can.

Turkeys seem to be natural producers of eggs. I make such a statement because many turkeys will attain as much as 75 per cent, or greater, production in any one month.

However, a short season also is natural to the turkey, and it it natural for the turkey to go broody. Both of these factors contribute materially to limiting of egg production.

The problem, then, resolves itself into producing non-broody turkeys that will lay out of season. Any breeding effort to increase egg production must perforce lengthen the season of production.

This was the problem as U.S. Department of Agriculture researchers at Beltsville saw it back in 1944. They started to breed Beltsville Small Whites for non-broodiness and greater egg production. How successfully this was done is shown in the accompanying table.

By breeding methods using individual performance and family records, egg production was increased from an average of 80 eggs in 1944, to an average of 146 eggs seven years later. And broodiness was decreased from an incidence of 90 per cent in 1946, to 25 per cent in 1951.

Because of the important effect of broodiness upon egg production, and because broodiness can be limited effectively in any flock with very little effort, this characteristic will be discussed first.

Just suppose we bred our turkeys for decreased broodiness, and made no effort whatsoever to increase egg production. What would happen to egg production?

From the data in the table, we can see that we decreased broodiness from 81 per cent in 1944, to 25 per cent in 1951. So far, so good. Now, suppose we did not increase egg produc-

Reprinted by permission from Turkey World, Mt. Morris, Illinois

tion of the non-broody and broody birds would remain about the same seven years later as in 1944. Only the incidence of broodiness would be different. Instead of 81 per cent of the turkeys being broody, only 25 per cent are broody. Hence, 25 of every 100 turkeys would be broody and produce only 70 eggs, the 1944 egg production of the broody birds.

It follows, then, that the 25 hens laying 70 eggs would produce 1,750 eggs in total. The other 75 were non-broody, and would lay 114 eggs, as the non-broody birds did in 1944. Therefore, 75 x 114 would give a total of 8,550. Combining these totals, we have 100 turkeys producing 1,750 plus 8,550, or a total of 10,300 eggs, for an average of 103 eggs per turkey.

This is an increase of 23 eggs more than we started with, and *all due to the increase in the number of non-broody birds.* A possible 14 more poults from these eggs would be worth approximately five dollars, or more, per hen.

Is it worth the effort? I think so, especially since it can be done with very little added cost.

It can be accomplished in three ways. The first is by trap-nesting the breeders and saving for breeders, especially in the case of males, only those poults that come from non-broody birds.

The second way requires that the broody birds be removed from the breeding pen, and save for subsequent breeding, only the late hatched males.

The third is by saving the non-broody hens for the next breed-

Egg Production for 9 Months
(Jan. 1 to Oct. 1)

Year	Ave. egg Prod.	Per Cent Broody	Average Egg Production of Non Broody	Average Egg Production of Broody	Difference due to Broodiness.
1944	80	81	114	70	44
1945	88	86	112	85	27
1946	85	90	118	81	37
1947	103	84	133	99	34
1948	109	61	125	104	21
1949	122	55	141	107	34
1950	120	51	141	105	36
1951	146	25	155	113	42

ing season, and using only males from them.

In any event, in all three ways, the poults from the non-broody stock must be identified with wing bands, or by marking the toes.

The heritability of broodiness appears quite high. Therefore, if males from non-broody stock are used each year, the broodiness in subsequent poults is bound to be decreased.

At first, it may be desirable to remove only those birds that are broody more than twice a year; then, those broody more than once; and finally, those that are broody even once, insofar as providing male poults is concerned.

At no time in the experiments at Beltsville, was a bird eliminated just because she was broody once or twice. If she had other desirable characteristics and was broody once, she was kept in the breeding flock. *But she provided no males for the subsequent season, only females.*

The last year of the experiments, the non-broody birds produced 155 eggs; those broody once, 138 eggs; those broody twice, 86 eggs; those broody three or more times, 93 eggs. From data such as these, it will be noted that non-broody birds laid more than broody birds, that to be broody once was not as poor as being broody more than once.

In addition to this, the percentage of broody birds at the end of the experiment was much less than at the beginning; 80 to 90 per cent decreased to 25 per cent during the last year. Not only that, but at the beginning of the experiment at Beltsville, some turkeys were broody six to nine times, whereas in the last part, only three turkeys were broody five times; seven, four times; none, three times; and only three were broody twice.

Of course, the quickest way to increase egg production is by the use of trap-nest and family performance records. In this manner, with careful selection of the breeders by individual and family performance, good progress was made in producing turkeys that laid a greater number of eggs than might be obtained otherwise. This is adequately shown by the data given in the table.

Many will state immediately that this may work for Beltsville Small Whites, but not for the Broad Breasted Bronze. I believe progress in egg production is possible in any variety of turkeys. It may take longer in some heavy varieties than in lighter weight ones, but it can be done.

During 1940, I was looking for some birds to cross with the Beltsville Small White to increase body weight to some extent since the progeny had gotten too small.

So, some Broad Breasted Bronze stock was hatched in 1940. This stock had a first year maximum live body weight for the females of about 17 to 18 pounds. At that time, we kept records to June 1 only. From these records, I selected the records of eight Broad Breasted Bronze hens out of a pen of 18.

These 18 hens averaged 20 eggs in February, 20 in March, 24 in April, and 22 in May, a total of 86 eggs in four months. Not only were they natural producers, but they produced at approximately the same rate in these months as chickens that lay as many as 230 to 260 eggs annually. Many breeders, including those at Beltsville, have produced turkey hens that laid more than 200 eggs during the year.

The problem, as I see it, is to breed turkeys for earlier maturity, non-broodiness, and persistence of production. And we will have turkeys, yes, Broad Breasted Bronze, too, that not only will lay 150 eggs a year, but excel the averages of 180 to 200 eggs now obtained per hen by chickens.

It needs only for a few of our fine breeders of turkeys to "bend" themselves to the task. I am sure that the breeders can do it.

DIFFERENT PLOW DEPTHS GOOD

Vary your plowing depth from year to year. It cuts down expenses and keeps a plow sole—plow pan layer—from forming so fast.

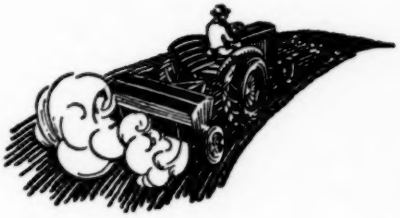
Plowing too deep or plowing at the same depth every year wastes time and money. Deep plowing is used only to break up any plow pan formed in the soil, or to mix sandy subsoil with top soil which contains a lot of clay. Plowing at the same depth year after year just speeds up the formation of this same plow pan, reports Lyman Amburgey, soils specialist at the University of Arizona.

If you have plowed at the same depth year after year, plow deep the first year. This breaks up any plow pan layer that may have formed. Then, raise your plowing depth to six inches the next year. The third year, plow at a depth of about eight inches, and the fourth year, plow about 12 inches deep.

Cut down on the times you need to use a ripper. If you have to rip about every five years now, that time can be increased to about eight years by plowing at different depths from year to year.

Arizona Extension

High Nitrogen Fertilizers Grow High Protein Grass



Startling results of experiments recently conducted at the New Jersey Station . . .

Condensed from
New Jersey Agriculture

RECENT research has indicated that the protein content of grasses can be stepped up considerably by the use of high-nitrogen fertilizers. This was first reported by researchers in Ireland and Scotland and later by an experiment station or two in the United States.

At the Georgia Experiment Station, for example, research men were able to increase both the yields and protein content of Bermuda grass by putting on 800 pounds of nitrogen per acre.

The New Jersey Station started work on this problem in 1952. Grasses used in the experiment were orchardgrass and reed canarygrass.

Two grass-legume mixtures were also used—alfalfa-orchardgrass and alfalfa-bromegrass.

All the fields were seeded in August, 1952. All seedings had 500 pounds of 5-10-10 applied at seeding time. From there on the treatment varied.

Each year the grass plots get a basic 100 pounds per acre of phosphorus pentoxide, 100 pounds of potash, and nitrogen applied at 50, 100, 200, and 400 pound rates. On the two heaviest nitrogen rates, one-half the nitrogen is applied in March, all the other fertilizer after the first cutting.

On the grass-legume mixtures, the fertilizer rates provide for three nitrogen levels of 0, 75, and 150 pounds per acre, and two potash levels of 150 and 300 pounds per acre, with the phosphorus held constant at 150 pounds per acre.

In both 1953 and 1954, the high nitrogen grass plots showed a remarkable increase in total yield and in percentage of crude protein. The New Jersey research men were particularly interested

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in the spectacular increases in protein.

The 1954 results are given in the accompanying table.

GRASS YIELDS—1954

Treatment	Dry Matter lb./acre	Crude Protein lb./acre
Orchardgrass		
50#N	4238	516
100#N	5742	779
200#N	6957	1098
400#N	8912	1794
Reed Canarygrass		
50#N	3932	541
100#N	5184	823
200#N	7041	1135
400#N	9381	1822

ALFALFA-GRASS YIELDS—1954

Treatment	Dry Matter lb./acre	Crude Protein lb./acre
Alfalfa—Orchardgrass		
1500 lb./acre of		
0-10-10	6725	1343
0-10-20	6906	1356
5-10-10	7136	1283
5-10-20	6833	1215
10-10-10	7346	1274
10-10-20	7052	1219
Alfalfa—Bromegrass		
0-10-10	7275	1637
0-10-20	7779	1753
5-10-10	7257	1646
5-10-20	7872	1697
10-10-10	7025	1542
10-10-20	7958	1741

The results with orchardgrass are particularly interesting because of the wide adaptation of this grass. Note that with 400 pounds of nitrogen this grass produced 8,912 pounds of dry matter per acre (total of three cuttings) with a crude protein content of 1,794 pounds! This is more than 20 per cent protein. Good stands of alfalfa average around 14 per cent.

This nitrogen application is perhaps 8 or 10 times as much as most farmers would normally apply to a stand of orchardgrass.

The sheriff was explaining why the defendant was charged with imbibing too freely.

"Judge," the officer said, I stopped to give this man a ticket for blocking traffic and found him very agitated. He told me he couldn't move his car—that he had just gotten in it to discover that thieves had stripped it of steering wheel, brake, clutch and gas pedal."

"And what are the facts?" snapped the judge.

"Well, the main fact," replied the sheriff, "is that he was in the back seat."

Thus the tests at the Dairy Research Farm, which have another year to run, have already demonstrated that heavy applications of nitrogen will double or triple the content of crude protein. Now the question arises: "Will cattle and sheep eat this high protein grass, and if they will, how efficiently can they use it to make milk or meat?"

Vibriosis In Cattle

New light on this troublesome dairy disease which is present in many herds . . .

Condensed from Holstein-Friesian World

Dr. Kenneth McEntee, N. Y. State Veterinary College

VIBRIOSIS is one of the most important causes of lowered fertility in dairy cattle.

We used to think that *Vibrio fetus,* the bacterium which causes the disease, merely caused an occasional abortion and was not of very serious concern. We now realize that lowered fertility is the major manifestation of the disease and this may result in considerable loss.

Vibriosis is a veneral disease—that is, it is spread by service to infected bulls either through natural service or artificial insemination if the semen is not properly treated.

In recently infected herds the majority of cows and heifers require several services before becoming pregnant. In an experiment recently conducted at the New York State Veterinary College a group of 15 heifers required an average of 5.6 services per pregnancy when artificially inseminated with semen from infected bulls. Two of these heifers required only one service while at the other extreme one did not become pregnant until she had been inseminated 16 times. At the same time a group of 9 control heifers were inseminated either with semen from non infected bulls or semen which had been treated with penicillin, streptomycin and sulfanilamide. These heifers required an average of 1.3 services per pregnancy.

In herds which have had vibriosis for a year or more, breeding trouble is present mainly in the heifers because the older cows, which have had the infection, develop immunity. Apparently bulls do not develop immunity and thus may carry the infection for years.

Infected heifers and cows often have long estrual cycles of 25 days or more. This is probably a manifestation of early death of the embryo due to an unfavorable uterine environment created by the infection. In cows with healthy reproductive organs, the estrual mucus is clear as glass. Vibrio infected females frequently have cloudy estrual mucus which gradually becomes clear as

Reprinted by permission from Holstein-Friesian World, Lacona, New York

the animal overcomes the disease.

Abortions generally do not occur in more than 10% of the cows and may occur any time during pregnancy.

Until recently, vibriosis has been difficult to diagnose. We had to rely largely on the isolation of the organism from an aborted fetus. This caused considerable difficulty because the infection is generally present several months before abortions occur. Furthermore the organism is not always present in aborted fetuses from infected cows. The blood test has been used rather widely but it has been quite unreliable in our experience. The antigens (test materials) vary greatly in sensitivity. One antigen may be so highly sensitive that non infected cows may have high titers (reactions), while another antigen may fail to reveal the presence of infection in diseased animals.

Recently a vaginal mucus test has been developed which is very useful. The mucus becomes positive in approximately 2 months after service to an infected bull. The mucus will react for approximately 7 months after it becomes positive. Progress has also been made in the technique of culturing vibriosis so that they may be isolated from the semen of infected bulls and the vaginal discharge of infected cows.

The easiest way of controlling vibriosis is to artificially inseminate cows and heifers with semen from non-infected bulls or to use semen which has been properly treated with antibiotics. The semen of infected bulls can be used safely if 500 units of penicillin, 500 micrograms of streptomycin and 0.3% sulfanilamide are added to each cc of semen which is diluted at least 1:25 and held for at least 6 hours at refrigerator temperature before use. A virgin bull may be used to breed virgin heifers but one must be sure that the young bull is not allowed to serve older cows which may be infected. We do not know how long vibriosis persists in infected cows, thus we cannot say when it is safe to use a clean bull on cows which have had the disease.

Treatment of infected cows with antibiotics probably hastens recovery but we cannot rely on treatment to eliminate *Vibrio fetus* from the reproductive tract.

We know how vibriosis is spread and have improved diagnostic methods. Furthermore it has been found that semen from infected bulls can be used if it is properly treated with antibiotics. However, we do not have all the answers to the Vibrio problem. More research is needed to determine how long *Vibrio fetus* persists in infected cows. Work also must be done to find more edequate methods of treating infected cows and bulls.

Michigan's Outstanding Young Farmer

The remarkable story of a young farmer who didn't want to be a farmer . . .

Condensed from Michigan Farmer
Fred Trump

ALL-OUT, efficient, large-scale farming has really paid off for Alvin Hansen, 35, of Stanton, Michigan, and for his wife, Helen, and their family. In 9 years they have attained a $250,000 investment in 620 acres, in buildings and in equipment that is 90 per cent free of debt. This includes a modern $60,000, 9-room brick and stone ranch-type home, which he built in 1952 and 1953.

Hard work, good soil management, good farming ability, high machinery investment, marketing efforts and an open mind have helped. But there's more reason than these things that Hansen was chosen Michigan's Outstanding Young Farmer of 1955 by the Michigan Junior Chamber of Commerce. Hansen was chosen from 21 leading young farmers at an April 23rd dinner at Lansing. Hansen will represent Michigan in the national contest at Minneapolis in June.

Buys 560 Acre Farm

He was born and raised on a farm near Edmore, where his father still farms. At 18 Alvin went to work for his uncle, a building contractor in Detroit, where he soon became a foreman. While there he married. Rejected for military service and unable to continue in the building business, he returned to the home farm in 1942. He worked there, had a milk route and sold potatoes for 2 years. Then for 2 years he rented and farmed parts of 2 farms.

By 1946 he had earned enough —mainly from his work in Detroit—to make a down payment on a 560-acre farm. He paid for the $40,000 farm within 7 years with one-third of the proceeds of his crops. Also in 1953 they had a new home and machinery free of debt! Alvin had dairy cows and fed some fat stock until 1953, but since has gone over to crops entirely—specializing in potatoes. In 1950 he bought 60

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acres more. Of his present 620 acres, 530 are arable.

The farm was quite rundown in 1940. The buildings needed repair and paint and the soil was badly depleted. Boards were re-nailed, new doors and roofs put on and the buildings repainted. The bright red buildings and well-kept grounds now make their farm one of the show places of Montcalm County.

Old barn cellars were made into potato storages by lining walls with old boards, with shavings between for insulation. A 7,000-bushel pit potato storage was made in a bank with a bulldozer. Old material on the farm was used to make a roof for only $250. Gas heaters are used to protect the spuds from freezing. Pine stump fences have been removed, stone piles buried and an old gravel pit leveled with a bulldozer, all at a cost of $10,000. This work has given larger fields, more land and greater efficiency.

Sound financing — through PCA and Federal Land Bank— has helped much. So has his father's counsel helped.

Alvin and Helen both give much credit for their success to advice from and cooperation with the extension service in the county. Alvin follows in his father's footsteps in this respect.

Alvin has always used the best soil management practices to get the highest possible production. Last year he raised 80,000 bushels of potatoes. His yield per acre of 915 bushels of Chippewas from foundation seed was the second largest yield in the state.

Every year 140 acres of rye are used as a cover and green manure crop ahead of potatoes and pickles to prevent erosion and add organic matter to the soil. All wheat straw, hay and other crop residues are plowed under. Wheat and rye are topdressed with ammonium nitrate each spring; in fact he used 140 tons this year.

Once-over fitting with a heavy-duty disc and field cultivator and plowing is done for potatoes. Spuds are planted on the furrow and pickles are planted on soil fitted with a plow-soil mulcher combination to control erosion. Some 1,500 pounds of complete fertilizer are used per acre on potatoes at planting, and nitrogen is added when the plants are up to 6 inches.

Hansen spent $11,875 for fertilizer in 1954.

A good spray program is a main cog in his potato growing. The 1954 crop was sprayed 12 times with a fungicide and DDT. A side-boom row-crop sprayer is used. Irrigation water applied 5 times last year, gave the crop 8 inches of extra water.

Can Irrigate Whole Farm

With the help of Victor Beal, county agent, and Ernest Kidder,

ag engineer, he put up 2 dams in his woods. The ponds in 1954 supplied irrigation water for 110 acres of potatoes and 40 acres of pickles. With the recent completion of a large deep well he has made irrigation available to the whole farm. He borrowed $30,000 to finance the irrigation investment in 1954.

This year his crop plans are: potatoes, 120 acres; pickles, 20; wheat, 103; oats, 60; strawberries, 16; hay for soil-building, 163; summer fallow, 55.

Young Hansen also realizes that producing is only half the job; marketing is the other half. His ability has extended to that field as well. He has 2 large trucks that he uses to sell his high quality potatoes directly to chain stores and wholesale brokers. He packs the spuds himself and sells them under the Ranch Brand name.

He has 5 full-time hired men, for production work in summer and marketing in winter. Migrant labor is used for the potato and pickle harvest. He also has a well-equipped farm shop.

Four new 1,000-bushel steel bins are for wheat storage. He has 5 tractors and a full line of equipment, a new 2-row strawberry planter, a new 5-bottom plow, a new 4-row potato planter, and a large self-propelled combine. He plans to build a migrant labor housing unit and a new potato storage to hold 65,000 bushels. The latter will have a loading dock and office.

His outstanding record is all the more remarkable since Alvin at 21 did not intend to be a farmer.

MECHANICAL ELEVATOR SAVES TIME, MONEY

Farmers can do away with a lot of unnecessary labor by installing a mechanical elevator.

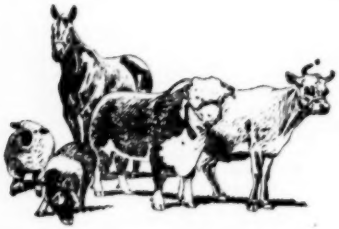
Agricultural engineers say an elevator will take the labor out of many farm jobs that ordinarily are the most arduous.

An elevator will transport bales of hay, sacks of grain and feed, and loose ears of corn, all cheaply and more efficiently than by hand.

Most elevators on the market work on the principle of moving, cleated belts. A size and type to fit almost any need can be found. They are built in different lengths to suit individual needs. A good rule of thumb is to get your elevator one and one half times as long as the height of the anticipated lift. For example, if a load must be raised 16 feet above ground, get a 24 foot elevator.

Virginia Polytechnic Institute

U. S. Breeding Stock Moves to Foreign Pastures



Exportation of purebreds to foreign countries offers good opportunities.

Condensed from Foreign Agriculture

Dr. C. S. Stephanides

UNITED STATES livestock breeders are selling more and more breeding stock to foreign countries; last year the United States exported 17,400 cattle for breeding—the largest number since the peak year 1946—and 11,600 breeding sheep and lambs. Each United States animal that arrives in a foreign port carries with it the reputation of our livestock industry. And so the proper selection, careful handling, and successful transportation of breeding stock is a job well worth our best efforts.

For centuries livestock has been on the move within continents and between them. Cattle have traditionally formed part of the spoils of war. According to early Greek historians, Alexander the Great carried off cattle from India after his campaign there. These cattle were sent to the Greek colonies that settled in Italy and later moved north into the Alps. And it may be that today's Brown Swiss cattle are remote descendants of those that Alexander captured. Their docile temperament, large dewlaps, prominent humps, large ears, and hardiness are all points of resemblance with the Indian cattle of today.

But few historical movements of livestock could compare in importance with the continent-to-continent shipments of the past 10 years. First came the large shipments that private, national, and international agencies made to help rebuild the livestock population of devastated Europe. From this tremendous undertaking we learned much about ways to move livestock efficiently. Then came the first years of shipments under technical cooperation programs. These taught us a great deal about such things

Reprinted from Foreign Agriculture, Washington, D. C.

as the type of advance planning that is necessary, the records that should be kept, and the problems raised by long-distance hauls, as well as weather and special considerations for each area.

The lessons that these years of experience have taught are doing good service now and can do even more in the future, for a third type of great intercontinental movement is well under way and gaining speed. More than 39 countries are importing United States breeding stock to improve and increase their native stock. Some of these livestock improvement programs are extensive in scope, and each is a sign of improved living conditions in a developing economy. Strong government support of the programs, especially in Latin America, indicates their importance to the countries concerned.

In Columbia, the government has authorized the Columbian Bank (Casa de Credito Agrario Industrial y Minero) to make loans to individuals, firms, or organizations for the purchase of domestic purebred bulls or imported livestock of all types. To encourage the importation of purebred animals, the government has allowed a special tax exemption and increased the maximum loan to individuals from $4,000 to $10,000.

In Honduras, cattle breeders may now borrow from the Honduras Development Bank up to 80 per cent of the value of the breeding stock they import. Also, the government is considering the establishment of feed manufacturing centers and of marketing facilities for livestock products.

In Bolivia, the Servicio Agricola Interamericano and the Bolivian Development Corporation have agreed on the establishment of a 1,000-acre cattle-improvement project at Reyes. Santa Gertrudis cattle from the United States will be introduced for experimental crossing with domestic types.

In Mexico, 3,874 head of registered stock were imported from the United States in 1953 to improve the local beef cattle. Mexico has also been expanding and improving its dairy stock by means of increased imports from Canada, where prices are favorable. In the next few years, Mexico must further increase its imports of dairy cattle in order to meet the ever-growing need of its people for fluid milk.

In Venezuela, the government has set up a revolving fund to finance its annual purchases of 5,000 head of registered Brah-

man cattle from the United States. These cattle will be resold to Venezuelan farmers at cost.

In Nicaragua, the Instituto Nacional de Fomento has begun a program of purchasing Brahman cattle for resale to Nicaraguan farmers and ranchers.

Among the problems in setting up a livestock improvement program is the handling and transportation of the selected stock. Of course, there must first be a clear understanding as to the utilization of the stock and the kind of care and management that will bring the fullest benefit from its productivity. Then buyer and seller should work together on the details of the journey. They need to consult on such points as the means of transportation, the loading and unloading facilities, the areas through which the animals must pass, the attention needed en route, the number and location of resting points, and the shelter and feed required immediately after arrival.

Whatever we do, livestock shipped for long distances always arrives somewhat run down. But certain principles apply to any shipment of breeding stock. Do not start the animals off too fat; provide timothy hay and clean water, but do not overfeed en route; and on long rail or truck trips, unload at intervals for exercise and rest.

Breeding cattle are difficult to transport long distances. Transportation is more costly by air than by boat, rail, or truck, but keeps mortality and disease rates

WRECKER OR BUILDER?

(Author Unknown)

I watched them tearing a building down;
A busy crew in a little town;
With a ho-heave-ho and a lusty yell,
They swung a beam and a sidewalk fell.
I said to the foreman, "Are these men skilled
As the men you'd hire if you had to BUILD?
He gave me a laugh and said, "No, indeed!
Just common labor is all I need;
These men can wreck in a day or two
What BUILDERS have taken a year to do"
I asked myself as I went my way,
Which of these roles have I tried to play?
Am I a BUILDER who works with care,
Measuring life by the rule and square;
Or am I a wrecker who walks the town,
Content with the labor of tearing down?

low. Young animals are easier to handle than older ones. Ideal shipping times are early fall and spring. Sheep and goats, oddly enough, are harder to handle on long trips than cattle are. They should not be shipped in hot weather, and are apt to pick up contagion in areas that are hosts to little-known diseases.

Marketing Standards

Marketing standards, controlled by the breeding associations, would help to maintain and expand the demand for our breeding stock.

So that the prospective buyer may be confident of his choice, animals for export might well be accompanied by complete information on their health and condition; on their production records; on their parentage and breeders; on their characteristics; and on where other animals of the breed have been exported, and how they and their crosses are doing. Our breeding associations might furnish to United States Government representatives abroad the location of various breeds for export, and the cost of transportation and handling to the nearest port or airport. For there is every indication that the future demand on our breeding stock will be great, and we must be ready with answers when questions are asked.

Pipeline Cuts Work, Saves Milking Time

Been wondering whether milk handling will make your milking chores easier? It may depend on just how you get the milk to the tank, say dairy scientists.

A cleaned-in-place pipeline will save 25% of your milking time if you have 20 or more cows and use a bulk milk system.

You can install such a pipeline in either a stanchion or parlor-type barn, but time saving is even greater if you combine a cleaned-in-place pipeline with parlor milking. A longer and more expensive pipeline is necessary for stanchion milking.

Even in a stanchion barn, a milking parlor will pay off with a large herd. An elevated parlor stall makes milking easier, quicker, and safer.

With a parlor in a stanchion barn, you'll need a covered holding pen for all the herd, or at least for 20 cows waiting to be milked and for cows after milking. That way, one man can turn cows from the stanchions into the holding pen, milk them, let them back into the holding pen, and later back into the stanchions. In summer, the stanchions need not be used at all.

Virginia Extension

CLEANING EGGS

Detergents and sanitizers prove satisfactory for cleaning market eggs . . .

Condensed from Ohio Farm and Home Research

A. R. Winter

PREVIOUS research work at the Ohio Station has shown that 10 to 25 per cent of the eggs produced under average farm conditions are soiled at time of gathering. Under poor management the rate may be much higher. Even under good conditions where there are enough clean nests and a dry litter, one may expect to obtain from 5 to 10 per cent soiled eggs.

Wet cleaning methods have proven to be more desirable than dry ones. Until recently, water alone was most widely used as a cleaning agent. Now, however, a number of detergents and combinations of detergent-sanitizer solutions are being recommended for use in water.

As a result of these changing methods, poultry producers, egg marketing firms, health officials and others have requested information regarding the merits of these cleaning materials. Consequently, the poultry science department of the Ohio Station began a study to obtain data on a number of pertinent factors such as effectiveness of the materials, keeping qualities of the eggs, cleaning time and temperatures needed, and others.

Our tests show that simple detergent compounds are as satisfactory as more complex mixtures for cleaning eggs. For instance, trisodium phosphate and sodium metasilicate proved to be equal to any of the 18 trade name detergent-sanitizers tested. Combining detergents with sanitizers did not reduce the efficiency of the detergents.

In hand washing tests, detergent solutions were prepared in 3-gallon earthenware jars in tap water at 100° F. Then two dozen soiled eggs selected at random for degree of soil were placed in the jars and allowed to soak for 10 minutes. Then they were washed by rubbing with a rag until all dirt and stain that would come off easily was removed. The cleaning efficiency of water was improved 10 to 15 per cent by adding a detergent. Use of one

Reprinted by permission from Ohio Farm and Home Research, Wooster, Ohio

ounce of detergent per gallon of water was the most satisfactory rate. These detergents, however, did not remove all stains.

Machine washing of eggs employing a small brush-type egg cleaner, was not as thorough as hand washing. A rubbing effect was necessary to remove the dirt and stain from many of the eggs. On the other hand, use of a larger conveyor brush and blower-type machine gave about equal results as hand washing did, provided the eggs were presoaked in a detergent-germicide solution for 10 minutes.

The spray and bubbler type washers created much foam when a detergent-germicide was used. Straw, feathers, and other light material were suspended in the foam on the surface, When the basket was lifted out, some of the material stuck to the eggs. Consequently, the cleaning efficiency was improved somewhat when the baskets of washed eggs were hosed off with warm water.

Washing eggs removes many bacteria from the shell, but also leaves many. Therefore, it would seem that a sanitizer should be used with the detergent or immediately following it and in sufficient concentration to kill bacteria remaining on the shell. From other tests, there is also some evidence that the eggs should not be rinsed with water after washing in a detergent-sanitizer solution. As the eggs dry the germicide becomes more concentrated. It has a longer time to act if not washed off.

This experiment showed that even clean eggs contain many bacteria on the shell surfaces at time of gathering. The longer the bacteria are left on the eggs, the warmer the temperature and damper the surroundings, the greater the infection and spoilage that can be expected.

Many large poultry farmers may, in the not too distant future, wash all their eggs the day gathered in a warm detergent-germicide solution and allow the solution to dry on the eggs. This practice should destroy bacteria on the shells before they penetrate the eggs; partially close the egg shell pores; and form a surface barrier against later contamination from air and handling and packing material.

Use Tasteless Compounds

What about the keeping qualities of washed eggs? This factor was also included in the experiment. To begin with, compounds for washing eggs should be colorless, odorless, tasteless, and have low toxicity. Since bacteria may pass through the shell and shell membrane, it is also possible that some egg cleaning solutions may gain entrance and interfere with the egg quality.

To obtain information on this point, one dozen fresh eggs were

soaked for 30 minutes in a cold tap water solution (0.3 per cent) of detergents and detergent-sanitizers. They were then removed, dried with a fan, broken out and the whites and yolks separated. Whites were tested for appearance, odor, flavor, pH, beating time, specific gravity, and stability of foam.

It is significant to note that none of the samples were abnormal in appearance, odor, or taste. The pH of all of them was 9.2. Beating time of samples soaked in detergent-sanitizers was less than that of the sample soaked in water. There was practically no difference in specific gravity and stability of foam.

Cakes Satisfactory

The final and most important measure of the functional properties of the egg white is its performance in angel food cakes. All cakes were satisfactory as measured by cake volume and such qualities as appearance, tenderness, texture, moisture, and flavor.

The Northeast Poultry Producers Council of Trenton, New Jersey, offers a service for testing detergent-sanitizers and approving or rejecting them for egg washing. The approved list is revised from time to time. A copy may be obtained by writing to the Council. Most of the approved detergent-sanitizers are alkaline, contain a quarternary ammonium compound, and are formulated to contain 200 parts per million of germicide when used at the recommended rate of 1 tablespoon per gallon of water for sanitizing eggs.

Darker Bones in Chicken A Sign of Early Age

When your city cousins appear a little squeamish about the dark discoloration around the bone in fried chicken, and even some of the meat appears darker, let them know that it's only a sign of a young bird. Specialists say the discoloration is greatest in younger birds. It is not a sign of an inferior or unhealthy chicken.

Not more than five dozen of soiled eggs should be washed per gallon of cleaning solution, and it is a good plan to mix up a new solution each time eggs are to be washed.

From the standpoint of price differences, it will p r o b a b l y always pay a farmer to wash eggs. Market quotations from several sources show that soiled eggs sell for 10 to 40 cents per dozen less than clean eggs. And the average time for cleaning a case of eggs is approximately 33 minutes. The advantage in this practice is quite apparent.

" Long " Pruning Nearly Doubles Peach Yields

This method, used widely in California, proves acceptable to the East . . .

Condensed from New Jersey Farm and Garden

Dr. Norman F. Childers, Rutgers University

THE "long" system of pruning is used almost entirely by California peach growers. In use for over 25 years in that state, this system is now spreading to other areas.

While plenty of sunshine and irrigation water are important factors affecting greater yields in California compared with the East, it seems to me that this pruning system was quite important in upping the yields.

Immediately, we think of the work of Nelson K. Shaulis, of the New York Agricultural Experiment Station, Geneva, and his recent study of factors affecting yields of grapes. Where he could increase Concord yields by a half ton per acre by a better fertilizer, he could increase yield by four tons by leaving more wood at pruning time for vines that could carry it!

Essentially, this is what the California peach growers are doing—leaving more fruiting wood on varieties and trees which can handle it.

From tests over a five-year period, we have learned that the long pruning system looks promising for New Jersey and is worth careful and further study under our conditions.

Under New Jersey conditions we have noted in our fertilizer tests over the past eight years that where yields are increased by use of more fertilizer, particularly nitrogen, breakage on the trees is a real problem. This breakage not only reduces yields but causes excessive sucker shoot growth, and tends to force the tree off balance in fruitfulness.

Propping by timber posts is a laborious and expensive job each season. It is so tedious, in fact, that most growers use no system of propping but tend to keep their trees low and relatively small by conservative use of fer-

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tilizer and by pruning the trees back for better limb leverage. Also, the main argument for the "short" type of pruning used in New Jersey is the greater ease of managing the trees from the ground with relatively little use of ladders.

In the long pruning system peach trees are permitted to grow about as high as they will, which is between 16 and 18 feet under California conditions. The tree framework is trained essentially in an upright, bowl shape. With the first crop of fruit a No. 11 wire or double-strength binder twine is placed around the main tree limbs temporarily for bracing. As the tree grows taller the wire is raised about a foot or two at a time until it is located permanently about three-fourths of the height of the tree. Special galvanized tin plates, 1½ x 2 inches with a hole through which the wire is strung, are nailed loosely on the outside of the limbs to prevent the wire from cutting the limbs excessively.

Once established, these wires remain in place for 12 to 15 years or more under California conditions. Placement is a rather tedious job during the dormant season, since it takes two or three men on ladders, working one tree at a time, but once established there is little maintenance involved. Tree breakage is reduced to a minimum by such bracing, as our experiences in New Jersey also have shown. The tree lasts longer and because of its greater height has a higher production level. No annual bracing with posts under the limbs is necessary. Of course, with the taller trees, platform pruning is necessary and advisable, as it now is being used in most of the apple orchards in New Jersey.

The first question usually asked by growers unaccustomed to this long system is, "How about the greater expense and effort needed to harvest fruit four to six feet higher above the ground?" The answer is that the effort is probably worth-while if we can harvest from 50 to 100% more fruit. Also we climb apple trees 16 to 18 feet or higher to get fruit; why not climb peach trees? Most California growers harvest between 800 and 1,400 bushels to the acre of peaches; the better yields in New Jersey are between 400 and 600 bushels to the acre, and many orchards fall below these figures.

In our experience with this long system, we have found that the limbs must be braced for the first good crop of fruit and thereafter as the tree is reaching its height; otherwise the limbs will continue to spread with the weight of each crop, and it will be impossible to obtain the upright tall tree characteristic of

the long pruning system.

Our best results were obtained at Menantico Colony near East Vineland, New Jersey. In this test we used four rows of 20 trees each, with the varieties Golden East, Raritan Rose and After Glow. Some varieties respond to the system better than others, particularly those which tend to be naturally larger trees. The Golden East row of trees seemed to respond best, although the other varieties were satisfactory. Also, the fertility of the soil is important and the amount of fertilizer used. With the long system it is desirable to grow a large tree and, thus, a relatively fertile soil and/or more fertilizer is needed.

In the Menantica Colony test we started with the trees when they were two years of age. It is particularly important on young trees to eliminate the sharp-angled crotches as soon as possible. With the long system the pruning is somewhat heavier the first few years than for the New Jersey system, but this is done primarily to establish a strong framework adaptable to wire bracing for the future double-size tree. While some yield may be sacrificed the first year or two with this pruning system, the tree is longer lived and brings better yields later. In comparison with the New Jersey pruning system, yields per tree at Menantico Colony were one 16-quart basket greater per tree for the California long system for 1953, and four baskets greater for 1954.

The difference was even greater for 1955; a yield of 5½ bushels per tree under the California system for five-year-old trees as against 3-3/5 bushels for the New Jersey system. (Actually, these "1955" figures are a postharvest report based on 1954 yields.)

Results from the current harvest, while not yet complete as of mid-September, appear to show a difference of two bushels per tree in favor of the California system, despite six-year growth.

After the tree has attained full height and spread, it has an upright rectangular box shape with fruit distributed throughout the tree. Much of the fruit is born on "hanger" branches which are lateral growths on the outside of the main branches. When these become laden with fruit they hang downward in a S-shape within a foot or two of the ground at harvest. These branches are maintained permanently and thinned out or headed back slightly each dormant season to maintain vigor and to reduce the fruit-thinning job. There is relatively little heading back of limbs in the long pruning system, most of it being a thinning-out operation.

John Quail, agricultural extension agent at Fresno, Calif., claimed to me that with the long

pruning system the balance between vegetative growth and pruning is maintained better for the peach, at least under his conditions. He indicated that with our pruning system in the East we tend to prune too heavily to keep the trees low so that we can manage them largely by standing on the ground. This, he believes, results in excessive shoot and leaf growth and a tree more susceptible to winter injury. Also, the fruit is of poor color and quality, and susceptible to brown rot. In our experience at Menantico Colony we have noted that the amount of vegetative growth on the long-pruned trees is not excessive, whereas, in many cases the New Jersey pruned trees have too much shoot growth—at least for the same amount of fertilizer and under the prevailing soil conditions. The soil is relatively fertile for peaches.

In summarizing, peach growers may wish to try the California "long" pruning system on a few trees to see how it works under their local conditions and also to learn how to use the system. The long system shows promise of higher yields and longer-lived trees. It may be of interest to note that the long pruning system is not only being used on peaches in California, but also has been adapted to most of the deciduous fruits in that state, including almond, apricot, plum, sweet and sour cherry, and apple.

New Eartagging Plan for Cattle

A nation-wide, uniform plan for identifying dairy and beef cattle with only one eartag for each animal is being pioneered by the U.S. Department of Agriculture. Farmers have long complained of the "Christmas-tree" effect when there are different identifying tags for each different herd-improvement or disease control program.

The plan is based on a numbering system found practical in the past for use in dairy herd improvement activities.

This new system provides a combination of letters and numbers sufficient to tag more than eight billion cattle in the United States and territories without a single duplication.

Most important feature of the new system is a single "book" (record of number assignments) kept in each state. Official agencies and groups will continue to buy identification tags where they choose, but they first will obtain a block assignment of numbers from the Federal or State official keeping the book within their state.

U.S.D.A.

Good Management Means $3 Per Hour For Work With Sheep

A ten-step sheep management program can mean three dollars for each hour you spend with your sheep flock.

Such returns are within the reach of any sheep raiser who manages his flock to produce only top grade lambs and sells them when they grade choice or better, says Art Pope, Wisconsin sheep specialist.

1. Feed the milking ewes well. Tests show that lambs from heavy milking ewes will gain nearly twice as much during the nursing period as lambs from poor milking ewes. A good ration for ewes is four pounds of good alfalfa, two pounds of corn silage, and two pounds of mixed grain daily, plus trace mineralized salt and bonemeal.

2. Dock all lambs at two or three days of age, and castrate ram lambs at two to three weeks.

3. Creep feed lambs with good alfalfa hay, ground grain and bonemeal and trace mineralized salt. For every 125 pounds of grain and 150 pounds of hay, suckling lambs eat from the creep, they will put on 100 pounds of body gain. It takes four times this amount for the same gain six months later.

4. Get rid of ticks with rotenone dust or spray.

5. Keep lambs in barn until pasture. The less they exercise, the better they will gain.

6. Drench the ewes before pasturing. Use phenothiazine two days before turning them out of the barn.

7. Vaccinate lambs against overeating disease. This condition often affects fast growing lambs on lush feed such as milk and early season pasture.

8. Drench ewes and lambs between June 15 and July 1. By this time the lambs have picked up many stomach worm larvae even though the ewes were drenched before pasture. Tapeworms may be a problem, so give the lambs one gram of lead arsenate when they are drenched with phenothiazine.

9. Take the lambs off bluegrass pasture after mid-July and put them on good alfalfa-brome pasture. Hay land that will yield five tons per acre in two cuttings will also produce 450 pounds of lamb during the season.

10. Top lambs out when they are ready. Earlier in the summer 85 pound lambs usually bring the best return per pound. Later in August and September the lambs should weigh 10 pounds more and they should be even heavier if sold during the fall.

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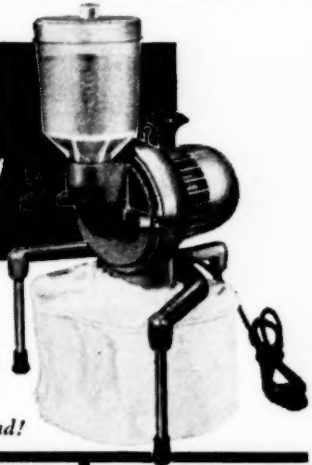

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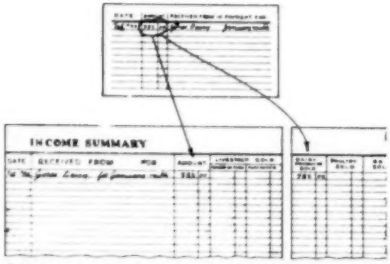
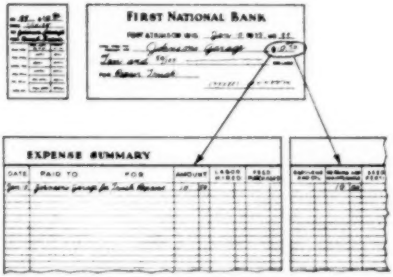
Secret of the new system — "It lets your bank keep your books". It provides a special farm bank deposit or pass book that you can substitute for the bank book you now use. In this new bank book, you or the teller have ample space to record where your deposits come from and what you sell. At the end of the year, a complete record of your farm income is ready to transfer to your Easy-Way Account Book.

Bankers like this new idea. Farmers now can take full advantage of their banking facilities . . . just like other business men. Your banker surely will be glad to cooperate.



Above: It's fast and easy to transfer income figures from the Easy Way Bank Book to the Account Book. Note how the forms are planned to provide the information you must have for your tax returns.



Above: It's even easier to keep a definite and indisputable record of your farm expenses as you go through the year. Just do what you should do anyway . . . pay by check. Note on the check or the stub what you bought or paid for. Later transfer this information to the Expense Summary of your Easy Way Account Book. Again, you automatically get the figures required for your income tax return.

For cash purchases which are easily forgotten and difficult to prove, special forms are provided in the Easy-Way Deposit Book. They tell you how much cash you withhold from deposits and make it easy to match up expenditures with cash you handle.

There's nothing else like the Easy-Way System. Depending on how you want to use it, it can provide a complete and comprehensive accounting of your farm business or only that required for your tax return. One farm family, using a similar system, figured time spent paid them $25.00 an hour. Start the new year right. Order your Easy-Way System today. Your money back if you aren't completely satisfied. Send only $2.00 to the address below.

FARMER'S DIGEST,
Fort Atkinson, Wisconsin